

REGIONAL FACILITY PLAN

FOR



TroublesomeCreek
ENVIRONMENTAL AUTHORITY

SUBMITTED BY:

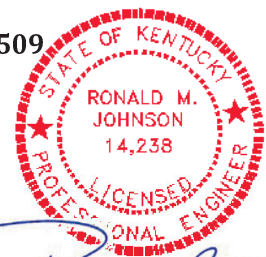
RMJE

R.M. JOHNSON ENGINEERING, INC.

3376 Hwy 550 E
P.O. Box 444
Hindman, Ky 41822

3213 Summit Square Place
Suite 100
Lexington, KY 40509

January 2015



A handwritten signature in blue ink, likely of Ronald M. Johnson, written over the professional engineer seal.



P. O. Box 444
Hindman, Kentucky 41822
Telephone: (606) 785-5926
Fax: (606) 785-0244
E-mail: info@rmje.net

3213 Summit Square Place
Suite 100
Lexington, Kentucky 40509
Telephone: (859) 543-1256
Fax: (859) 543-9873

January 20, 2015


Cindy McDonald, MBA
Supervisor, Wastewater Planning Section
Division of Water
200 Fair Oaks Lane
Frankfort, Kentucky 40601

Re: 201 Regional Facility Plan
Troublesome Creek Environmental Authority

Ms. McDonald,

Please find enclosed the 201 Regional Facility Plan resubmittal for your review. Should you require any additional information to expedite your review process, please contact me at your earliest convenience.

Sincerely,



Ronald M. Johnson, P.E.

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I. Regional Facility Plan Summary:

In August of 2006 the Troublesome Creek Environmental Authority (TEA) was formed as a non-profit entity through an inter-local agreement executed by the County Judge Executives of Knott, Perry, and Breathitt Counties. TEA's primary goal is improve the environment in and around Troublesome Creek, a shared resource among the founding counties. The entire Troublesome Creek watershed is approximately 246 square miles, or 158,000 acres, and covers the central portion of Knott County, the northeastern portion of Perry County, and the southeastern portion of Breathitt County. Troublesome Creek discharges directly into the North Fork of the Kentucky River at Haddix, Breathitt County, KY. The major tributaries that discharge into Troublesome Creek are Lost Creek, Buckhorn Creek, and Balls Fork (also known as Ball Creek).

From 2006 through 2009 TEA worked diligently to secure funds for their pilot project, known as the Ball Creek Wastewater Treatment Plant (WWTP) and Sewer Collection Project, located at the headwaters of Ball Creek in Knott County. TEA secured nearly \$6.0M in funding from several sources including the United States Army Corps of Engineers (USACE), the Kentucky Infrastructure Authority (KIA) by means of the American Recovery and Reinvestment Act (ARRA), the Knott County Fiscal Court, local coal severance funds and multi-county coal severance funds approved by Knott, Breathitt and Perry Counties. In February of 2010 construction began to complete the project which included a new 0.10 MGD Sequential Batch Reactor (SBR) WWTP, a 200 GPM lift station, 5.5 miles of 6" force main and 1.0 mile of 12" gravity sewer. The project was completed in March of 2012 and is now providing public sanitary sewer service to approximately 60 new customers.

Since the completion of this project, TEA has encountered a great deal of interest from the public within the Planning Area and has recognized the need for an organized, approved approach to accomplish the goal of enhancing the environmental and water quality throughout the Troublesome Creek watershed. The purpose of this facility plan is to accurately portray the existing environmental impacts and concerns, evaluate the alternatives to correct the problems, establish a schedule for implementation of the corrective actions, provide cost estimates for the work to be performed and to establish TEA's service area boundary. The major problems evaluated and discussed in this plan include the current stream condition of Troublesome Creek, the region-wide failures of sub-surface on-site sewage systems, the large number of residents within the watershed that exercise no sewage treatment and the lack of public wastewater infrastructure.

This plan reviews several alternatives TEA could implement in order to reach their goal of enhancing the environment throughout the Troublesome Creek watershed. Each alternative is evaluated in further detail in Section VIII of this plan. The recommended alternative chosen is to expand the one existing publicly owned WWTP and construct two (2) additional WWTPs along with many miles of accompanying sewer collection lines (both gravity and force main) and multiple system pumping stations throughout the entire watershed. This effort will greatly reduce the level of fecal

coliform and other pollutants in Troublesome Creek and its tributaries and assist in removing the stream(s) from the Impaired Stream List submitted to the United States Environmental Protection Agency (EPA) . The institutional arrangements have already been established through the inter-local agreement between Knott, Perry and Breathitt Counties. Completion of the projects described within this plan will eliminate a vast majority of the straight-pipe discharges, eliminate failing septic systems and eliminate the need for the package treatment facilities located within the watershed, to the maximum extent possible.

The effort detailed herein will require a great amount of effort and funding to complete. The three founding counties are committed to the effort and have a good working relationship to move the plan forward. Also, the Kentucky River Area Development District (KRADD) has been working closely with TEA since 2006. KRADD has provided great administrative support for all efforts of TEA and will continue their commitment throughout the implementation of this plan. Due to the large undertaking, the plan will be implemented in stages or phases over a 20 year period. A map showing the schedule of implementation is included within this plan (**See Sewer Collection and Treatment Area Map**). The total cost to implement the entire plan is estimated to be in excess \$70,000,000. User fees are currently based on the amount of potable water usage. The first 2,000 gallons of potable water used corresponds to a monthly sewer fee of \$28.50. Each additional 1,000 gallons of water used increases this monthly invoice by \$3.50. Funds will be sought from single county coal severance funds, multi-county coal severance funds, USACE, United States Department of Agriculture Rural Development (RD), United States Department of Housing & Urban Development Community Development Block Grant (CDBG), and the Appalachian Regional Commission (ARC).

The selected alternate is comprised of Sequential Batch Reactor type facilities for treatment and conventional gravity and pressure (and pump stations) sewage collection system(s), as detailed in Section X. The implementation will occur over the 20 year planning period and is comprised of three (3) regional WWTPs. The Collection/Conveyance System is shown on Figure A entitled TEA Facilities Planning , Collection and Treatment Area. The two (2) additional treatment facilities are proposed to be of the SBR type not only for the cost effectiveness, but also due to the familiarity with the operation of the existing Ball Creek Plant, which just began operation a couple of years ago and the Knott County Water and Sewer District has experience with the SBR process as well. The greatly reduced foot print of the SBR process also weighed heavily on the selection. When considering the land and development requirements of the other alternative type and treatment methods the costs were significantly higher in the final analysis. The SBR process was the best available alternative.

The implementation schedule proposed is as detailed in Section X. It is anticipated that the scheduled will necessarily be amended numerous times within the 20 year planning period as growth patterns change and financing availability changes. Generally the implementation is expected to occur as follows:

IMPLEMENTATION SCHEDULE

Planning Period	Infrastructure Projects
0-2 Years	Collection System and Phase 1 Riverside WWTP Area
2-5 Years	Collection System and Phase 1 Homeplace WWTP Area
5-10 Years	Collection System Expansion and WWTP Expansion Ball Creek Collection System Expansion and WWTP Expansion Riverside Area
10-20 Years	Collection System Extensions All Areas (major Expansion Homeplace) and Expansion Homeplace WWTP

The detailed implementation schedule anticipated is contained in Section X as Table X-1.

In summary the 0-2 year plan is anticipated to have a present worth capital cost of \$ 7.445 million, the 2-5 years projects will have a present worth capital cost of \$ 2.870 million, the 5-10 projects will incur a present worth capital cost of \$ 11.557 million and the 10-20 year period will see a present worth capital expenditure of \$ 8.772 million .¹

Since TEA is organized as a planning and infrastructure provision organization, once funding is acquired, design approved, construction completed and acceptance accomplished, TEA's involvement will basically cease. Arrangements will then be completed; Public Service Commission (PSC) approval sought and acquired, and an ASSET Transfer will be done wherein the completed infrastructure will be transferred to the respective organization for operation, maintenance and billing purposes, etc. The respective organizations would be; A) Breathitt County Water and Sewer District (BCWSD), B) Perry County Sanitation District No. 1(PCSD1), or C) Knott County Water and Sewer District (KCWSD). The same procedure was utilized with the Ball Creek WWTP and Collection System transfer to KCWSD and is near PSC approval.

¹Present worth costs here are calculated as a single payment at the end of the associated planning period for capital costs only. No OM&R costs are included here.

II. Statement of Purpose and Need

The purpose and need of this Regional Facility Plan is to organize TEA's efforts of enhancing the Troublesome Creek watershed into one document, to establish the service boundary, to establish the total number of potential sewer customers and future customers, to forecast the sewer flows in each area of interest, to create a Master Plan (MP), to estimate cost for each individual proposed project, to assist TEA in securing funds necessary to accomplish the intents of the plan and to forecast the schedule of construction projects.

The MP is needed to create a master document for the orderly, systematic approach of restoring high water quality to Troublesome Creek and improving the general water, air and environment within the area. The current water qualities of the streams are low due to excessive straight pipes discharging directly into the stream(s) and failing on-site septic systems.

Soils within the watershed are not conducive to sub-surface infiltration/percolation of septic tank effluent. Shallow bedrock further complicates the proper operation of leach fields. Subsequently there is a tremendous number of "straight pipes" which convey raw or under-treated wastewater directly to the streams. The local health departments are reluctant to strictly enforce the on-site treatment regulations since this would result in putting families out of their homes. The exact number of straight pipes are not available. This plan evaluates various alternatives that could be used by the Authority to improve the current conditions, and selects the best approach for the stand point of cost, implementability, conformance with state and federal environmental regulations and plans, and will serve to guide the authority to achieve these goals for the life of the plan.

The implementation of this plan is greatly needed in order to eliminate, to the maximum extent possible, the further degradation of the soil and water quality in the area and reverse that trend to improve the environment and living conditions within the watershed. Since this watershed is head water pollution the area downstream is highly impacted as well.

III. Physical Characteristics of the Planning Area

The physical characteristics of the planning area are those typical of the mountainous Appalachian region. Steep mountains rise 300-700 feet in elevation from the valleys. Each valley region has a localized stream which captures and transports all runoff from the sub-watershed. The valleys have become densely populated over time which has resulted in most of the developable (buildable) property being occupied by homes or other structures. Often homes exist within the 100-YR floodplain. Due to the steep topography and geologic conditions, soil conditions are generally not compatible with standard on-site sewage treatment facilities such as underground septic systems.

Many streams throughout the region are impaired due to high levels of fecal coliform. TEA's primary goal is to restore high water quality to the Troublesome Creek watershed and improve the general environment of the planning area.

The crowding of residences within the developable areas, which are typically the floor of the narrow valleys coupled with the poor soil characteristics (i.e. poor percolation qualities), has created a region which finds the proper treatment of sanitary sewage problematic. The crowding of most development into the narrow valley floors makes it even more difficult to maintain a buffer between the streams and sources of pollution. The lack of or limited availability of suitable building sites controls the density of development. This result is very dense "pockets" of houses/population separated at varying distances of very low density. The random high density pattern also promotes serious overload on the treatment capacity of the soil with respect to septic fields, while at the same time making wastewater collection systems somewhat costly.

Decentralized waste treatment and collection in the form of numerous packaged wastewater treatment plants with smaller collection systems are not practical from an operational stand point. These numerous facilities would also occupy desirable development property. The decentralized system proposed is felt to be the optimal configuration. Although there are some areas for which onsite wastewater treatment systems will remain the most cost effective and implementable alternate.

See the enclosed maps Figure A to view the mountainous terrain, streams, populated areas, county lines, watersheds, existing treatment facilities, etc.

IV. Socioeconomic Characteristics of the Planning Area

In order to project and understand the socioeconomic characteristics of the planning area we must first examine the characteristics of each county involved. The information discussed herein was gathered from the United States & Kentucky Census Data.

HISTORICAL POPULATION STATISTICS

BREATHITT COUNTY

The historical population changes for Breathitt County between the years 2010 to 1920 are as follows:

<u>Year</u>	<u>Population</u>	<u>Percent Change</u>
2010	13,635	- 15.3%
2000	16,100	+ 2.5%
1990	15,703	- 7.6%
1980	17,004	+ 19.6%
1970	14,221	- 8.2%
1960	15,490	- 22.4%
1950	19,964	- 5.6%
1940	23,946	+ 13.2%
1930	21,143	+ 2.6%
1920	20,614	-----

KNOTT COUNTY

The historical population changes for Knott County between the years 2010 to 1920 are as follows:

<u>Year</u>	<u>Population</u>	<u>Percent Change</u>
2010	16,346	-7.4%
2000	17,649	-1.4%
1990	14,906	-0.2%
1980	17,940	+ 22.0%
1970	14,698	- 15.3%
1960	17,362	- 14.6%
1950	20,320	+1.6%
1940	20,007	+ 31.4%
1930	15,230	+30.7%
1920	11,655	-----

PERRY COUNTY

The historical population changes for Perry County between the years 2010 to 1920 are as follows:

<u>Year</u>	<u>Population</u>	<u>Percent Change</u>
2010	28,712	- 2.3%
2000	29,390	+ -2.9%
1990	30,283	- 10.3%
1980	33,763	+ 31.3%
1970	25,714	- 26.4%
1960	34,961	- 24.9%
1950	46,566	- 2.6%
1940	47,828	+ 13.4%
1930	42,186	+ 62.0%
1920	26,042	-----

From the data above it is determined that population over nearly 100 years has changed in Breathitt County by -33.8%, in Knott County by +40.2% and in Perry County by +10.2%.

Densities encountered within the planning area are:

2010 Census Densities (Number per Sq. Mile)			
<u>COUNTY</u>	<u>CENSUS TRACT</u>	<u>POPULATION</u>	<u>HOUSING</u>
Perry	9703	54.3	24.0
	9704	175.4	74.0
	County Average	84.5	37.7
Knott	9601	25.9	12.7
	9602	35.6	16.4
	9603	100.9	41.6
	County Average	46.5	21.2
Breathitt	9207	21.1	9.3
	County Average	28.2	12.7

Note Tract 9704 in Perry County and 9603 in Knott County contain portions of the highly populated Cities of Hindman and Hazard, and as such, skew the number significantly, but also serve as an example of the discussed "pockets of high density development".

CURRENT POPULATION STATISTICS**BREATHITT COUNTY**

Breathitt County currently (2012) has a population estimate of 13,635 and has experienced a 1.8% decline in population since 2010. The population consists of 6.1% below the age of 5 years old, 22.8% below the age of 18 years old, 14.7% of persons 65 years old or over, and 49.9% of the total population being female. These characteristics generally follow the state of Kentucky's population statistics. The total number of housing units in Breathitt County is 6,119 with a homeownership rate of 70.2% which is slightly above the Kentucky standard of 69.5%.

The median value of owner-occupied housing units is \$50,600 which is significantly lower than the Kentucky average of \$118,700. This value demonstrates the economically depressed characteristic of the general area. Breathitt County has an average persons per household of 2.55 and a median household income of \$22,304 which is roughly 50% lower than the Kentucky average of \$42,248. The percentage of persons living below the poverty level is 30.0% which is significantly higher than the Kentucky average of 18.1%. The total persons per square mile are 28.2 which is significantly less than the Kentucky standard of 109.9; this statistic is indicative of the rural isolation and mountainous terrain.

Business statistics show a total retail sale per capita of \$6,652 while the Kentucky average is \$11,843. No building permits were acquired in 2012 and there were no manufacturers' shipments to the region.

KNOTT COUNTY

Knott County currently (2012) has a population estimate of 16,124 and has experienced a 1.4% decline in population since 2010. The population consists of 6.1% below the age of 5 years old, 21.3% below the age of 18 years old, 14.4% of persons 65 years old or over, and 50.2% of the total population being female. These characteristics generally follow the state of Kentucky's population statistics. The total number of housing units in Knott County is 7,394 with a homeownership rate of 74.2% which is slightly above the Kentucky standard of 69.5%.

The median value of owner-occupied housing units is \$59,500 which is significantly lower than the Kentucky average of \$118,700. This value demonstrates the economically depressed characteristic of the general area. Knott County has an average person per household of 2.67 and a median household income of \$31,735 which is roughly 30% lower than the Kentucky average of \$42,248. The percentage of persons living below the poverty level is 24.5% which is significantly higher than the Kentucky average of 18.1%. The total person per square mile is 46.5 which is significantly less than the Kentucky standard of 109.9; this statistic is indicative of the rural isolation and mountainous terrain.

Business statistics show a total retail sale per capita of \$2,782 while the Kentucky average is \$11,843. No building permits were acquired in 2012 and there were no manufacturers' shipments to the region.

PERRY COUNTY

Perry County currently (2012) has a population estimate of 28,241 and has experienced a 1.6% decline in population since 2010. The population consists of 6.4% below the age of 5 years old, 22.2% below the age of 18 years old, 14.1% of persons 65 years old or over, and 50.5% of the total population being female. These characteristics generally follow the state of Kentucky's population statistics. The total number of housing units in Perry County is 12,719 with a homeownership rate of 71.4% which is slightly above the Kentucky standard of 69.5%.

The median value of owner-occupied housing units is \$57,800 which is significantly lower than the Kentucky average of \$118,700. This value demonstrates the economically depressed characteristic of the general area. Perry County has an average persons per household of 2.61 and a median household income of \$32,538 which is roughly 30% lower than the Kentucky average of \$42,248. The percentage of persons living below the poverty level is 26.4% which is significantly higher than the Kentucky average of 18.1%. The total persons per square mile is 84.5 which is significantly less than the Kentucky standard of 109.9; this statistic is indicative of the rural isolation and mountainous terrain.

Business statistics show a total retail sale per capita of \$15,886 which is slightly higher than the Kentucky average of \$11,843. There were 13 building permits acquired in 2012 and there were approximately \$122,158,000 of manufacturers' shipments to the region.

PROJECTED POPULATION STATISTICS

In order to project the population in year 2030 we will rely upon the current 20-year population growth/decline trend for each county.

BREATHITT COUNTY

In 1990 Breathitt County had a population of 15,703. When compared to the population of 13,878 in year 2010, we see a net 20 year population change of -13.2%. If we project 20 years from the most recent population value of 13,635 (2012) using an estimated change of -13.2% we can anticipate a Breathitt County population of 11,835 in 20 years.

KNOTT COUNTY

In 1990 Knott County had a population of 17,906. When compared to the population of 16,346 in year 2010, we see a net 20 year population change of -8.7%. If we project 20 years from the most recent population value of 16,124 (2012) using an estimated change of -8.7% we can anticipate a Knott County population of 14,721 in 20 years.

PERRY COUNTY

In 1990 Perry County had a population of 30,283. When compared to the population of 28,712 in year 2010, we see a net 20 year population change of -5.2%. If we project 20 years from the most recent population value of 28,241 (2012) using an estimated change of -5.2% we can anticipate a Knott County population of 26,772 in 20 years.

CURRENT & PROJECTED POPULATION STATISTICS WITHIN THE SERVICE AREA

The entire Troublesome Creek watershed contains approximately 3,800 households. From the data above we know that there are 2.55 persons per household in Breathitt County, 2.67 in Knott County and 2.61 in Perry County. Taking an average of the three values from each county we get average persons per household value of 2.61. Thus, our current population within the service area is approximately 9,918 (3,800 X 2.61).

To project the 20-year population within the service area we can now take an average of the above calculated 20-year population change rates. Breathitt County has a change rate of -13.2%, Knott County's rate is -8.7% and Perry County's is -5.2%. If we average the three we find a composite population change rate of -9.0%. Thus, our service area population is approximately 9,025.

ECONOMIC & SOCIAL BENEFITS

Roughly 90% of the service area has no access to public sanitary sewer facilities. Nearly all residents treat their sewage by the use of an onsite septic tank system; some simply discharge their sewer into nearby streams by use of a straight pipe. On-site septic tank systems have proven to be problematic. Poor soil percolation properties and limited access to developable land outside the floodplain have caused environmental hazards throughout the region. Effluent discharge from septic tank systems cannot percolate through the soil. This results in untreated/undertreated sewage rising to the ground surface and creating an environmental and safety hazard.

This fact, coupled with the numerous straight pipes found throughout the system has contaminated the streams greatly. Troublesome Creek and its tributaries are listed on the EPA's impaired stream list due to high levels of fecal coliform, and other contaminants/pollutants. Providing public sanitary sewer facilities to the residents of this service area will greatly improve the environmental conditions by removing the fecal coliform and pollutants from the streams, groundwater and surface impoundments.

The residents within the service area will see many economic and social benefits when public sewers become available in their area. Home assessments should increase resulting in economic gains for the homeowner and increased property tax revenues for Breathitt, Knott and Perry counties. With the availability of public sewers, land that was previously undevelopable for a lack of wastewater disposal, are available throughout the service area. Commercial and residential developments can now be planned with the availability of public utilities. Industries can now be recruited that provide replacement jobs that have been lost due to the severe and drastic downturn in the coal industry.

With new jobs and income available the economy of the entire region will benefit. Without access to proper wastewater collection and treatment the area will continue to slip into the depressed conditions.

V. Existing Environment in the Planning Area

PHYSIOGRAPHY AND GEOLOGY

Breathitt, Knott and Perry counties are situated in the Eastern Kentucky Coal Field physiographic region. The area is a highly dissected plateau and consists of winding, narrow, irregular, steep-sided, ridges and narrow crooked valleys. The terrain is rugged and exhibits great local relief.

Geologically, the area is underlain by interbedded sandstone, siltstone, shale and limestone of the Pennsylvanian and Mississippian Systems. The level-bedded sedimentary rocks of the Breathitt Formation comprise the most extensive outcrops in the region. A major rock stratum consists of sandstone, siltstone, and coal interspersed with narrow beds of calcareous shale or limestone.

Ridges and valleys occupy about equal portions of the landscape. Few large streams are present and there is a general absence of flat land, except for narrow strips in the valley bottoms. Most of these bottoms are located within the floodplain and are usually the areas where existing homes are found. Upland elevations exceed 1,400 feet.

WATER SOURCES & WATER QUALITY

Most of the service area has access to potable water through means of public water supplies. Public water is supplied by localized and regional treatment facilities with their supplies being dependent on lakes, rivers or wells found throughout the service area. Existing treatment facilities can be found on the attached maps. The water quality within the streams is polluted with sediment, nutrients, organics, hydrocarbons, and fecal coliform which have resulted in the major streams such as Troublesome Creek to be placed on the EPA's impaired streams list (303 List).

Groundwater obtained from most drilled wells and some springs indicates not only the noticeable presence of hardness (CaCO_3) but additionally iron, sulfates, salt and manganese. This is a result not only of strip mining but to a large part on old abandoned oil and gas wells. Surface water quality suffers the same contamination but also suffers degradation from direct straight pipe discharges, undertreated wastewater, and non-functioning septic tank systems.

Troublesome Creek from MP 0.0 to MP 45.1 is specifically listed in the Final 2010 Integrated Report to Congress on the Condition of Water Resources in Kentucky, Vol. II 303(d) List of Surface Waters as non-supporting both as Warm Water Habitat and as Primary Contact (Recreation). Contaminants are sediment, siltation, specific conductance, Total Dissolved Solids

(TDS), and turbidity. Sources are listed as mining, municipal point source discharges, gas and oil production, failing septic tanks, and unknown. An approved TMDL has not been prepared.

Contained within the listing of non or partially supporting streams in the Kentucky River Basin, besides Troublesome Creek are other tributaries to Troublesome and sub-tributaries. These include Lost Creek in Breathitt Co. and Balls Fork in Knott County. The extent of the impaired water is staggering. Troublesome Creek does NOT have an approved TMDL (Total Maximum Daily Load) nor is one being developed for the other two streams.

TABLE V-A		
Impaired Streams/Waterways within the TEA Planning Area		
Breathitt County		
	Lost Creek 0.0 to 4.6 RM	Into Troublesome Creek
	Impaired Use(s):	Primary Contact Recreation Water (non-support)
	Pollutant(s):	Fecal Coliform
	Suspected Source(s):	Source Unknown
	Lost Creek 3.7 to 8.95 RM	Into Troublesome Creek
	Impaired Use(s):	Warm Water Aquatic Habitat (non-support)
	Pollutant(s):	Sedimentation/Siltation; Total Dissolved Solids; Turbidity
	Suspected Source(s):	Coal Mining; Loss of Riparian Habitat; Silviculture Harvesting; Streambank Modifications/Destabilization
Knott County		
	Balls Fork 8.3 to 11.3 RM	Into Troublesome Creek
	Impaired Use(s):	Warm Water Aquatic Habitat (non-support)
	Pollutant(s):	Sedimentation/Siltation; Total Dissolved Solids
	Suspected Source(s):	Managed Pasture Grazing; Non-irrigated Crop Production; Post-development Erosion & Sedimentation; Surface Mining
	Troublesome Creek 0.0 to 45.1 RM	Into North Fork Kentucky River
	Impaired Use(s):	Warm Water Aquatic Habitat (non-support); Primary Contact Recreation Water (non-support)
	Pollutant(s):	Sedimentation/Siltation; Specific Conductance; Total Dissolved Solids; Turbidity
	Suspected Source(s):	Coal Mining; Municipal Point Source Discharges; Petroleum/Natural Gas Activities; Petroleum/Natural Gas Production Activities (permitted)

SOILS

Three general soil associations have been mapped in the service area, including the Shelocta-Highspint-Cloverlick-Kimper, the Handshoe-Cloverlick-Fedscreek-Marrowbone, and the Shelocta-Cloverlick-Fedscreek-Kimper associations. Variations in the soils within and between associations generally reflect variations of topography and other patterns.

The Shelocta-Highspint-Cloverlick-Kimper association contains very deep, well-drained, steep soils and has loamy subsoil. Soils in the association are generally found on hillsides throughout the service area region. This association covers approximately 45% of the entire service area.

Individual soils mapped within the project area consist of Grigsby sandy loam, occasionally flooded, and Handshoe-Fedscreek-Marrowbone complex, 30 to 80 percent slopes, very stony.

Fedscreek soils are well-drained, moderately rapid permeable soils on hill slopes, mountainsides, benches, footslopes, and in drainage ways. The soils formed in loamy colluviums weathered from sandstone, siltstone and shale.

Grigsby soils are well drained, moderate to moderately rapid permeable soils on floodplains. These soils form in mixed alluvium.

Handshoe soils are well drained, moderately rapid permeable soils on sideslopes and footslopes on hills and mountains. These soils formed in colluvium weathered from acid brown or gray sandstone.

Marrowbone soils are well-drained, moderate to moderately rapid permeable soils on hill slopes, mountainsides, nose slopes and ridgetop crests. These soils formed in loamy residuum or colluvium weathered from interbedded sandstone and siltstone.

All soil groups within the planning area are rated as severely limited for use as on-site leach fields, or wastewater treatment systems. Percolation rates and depth to rock along with the steep slopes are the listed factors contained within Table 11 of the NRCS Soil Surveys for Knott, Breathitt, and Perry Counties.

CLIMATE

The climate in this area of Kentucky is continental in character, and temperature and precipitation levels fluctuate widely. The prevailing winds are westerly; therefore most of the storms cross the state in a west to east pattern. Low pressure storms that originate in the Gulf of Mexico and move in a northeasterly direction across Kentucky contribute the greater proportion of precipitation received by the state. Warm, moist, tropical air masses from the Gulf predominate during the summer months when humidity levels are high. As storms move through the state, occasional hot and cold periods of short duration may be experienced. During the spring and fall, storm systems tend to be less severe and have a smaller frequency, thus resulting in less radical extremes in temperature and rainfall.

The average daily temperature in the service area in January is 32.6 degrees Fahrenheit, and the average temperature in July is 74.5 degrees, based on data collected between 1961 and 1990. Precipitation level averages kept during the same period of time indicate that the area receives about 40 inches of rain annually.

VEGETATION

The Eastern Kentucky Coal Field physiographic region is located in the rugged east portion of the mixed mesophytic forest. The forest associations found in the region are the oldest and most complex of the deciduous forests. Because of the large number of dominants in the forest, the composition and relative abundance of the dominants vary greatly from place to place.

In the rugged eastern region, sugar maple-basswood-buckeye-tulip poplar segregates occur mainly on the north-facing slopes. Oak-chestnut and oak-hickory communities occupy upper slopes and ridgetop where rock outcrops occur, and beech and white oak are located where shale is the underlying rock. Oak, oak-hickory, and oak-pine communities comprise the modern eastern Kentucky forest community.

The herbaceous vegetation of the understory is exceedingly rich and varied and includes showy flowers and ferns. The interdependence of the canopy and the herbaceous layer is strongly marked. Much of the area within the mixed mesophytic forest region is now occupied by secondary forest, and many of these areas bear little or no resemblance to the original forest cover.

CULTURAL

According to information provided by the Kentucky Heritage Council, cultural and archeological sites may exist within this east Kentucky region. Cultural and archeological surveys will be conducted for each individual phase of the proposed work prior to construction.

ENDANGERED SPECIES

The Kentucky Department of Fish and Wildlife Resources and the U.S. Department of the Interior Fish and Wildlife Service provided information regarding currently listed, or candidates for listing, as federally endangered species:

Gray Bat (*Miotis grisescens*) – listed

Indiana Bat (*Miotis sodalist*) – listed

Kentucky Arrow Darter (*Etheostoma sagitta spilotum*) – candidate

The proposed service area encompasses a vast area of eastern Kentucky. Biological surveys and studies will be completed prior to commencing any work within the service area to determine the affect (if any) upon threatened or endangered species.

OTHER PROTECTED AREAS

Within the planning area there are no known national parks or USDA Designated Important Farmland areas. Most of the work constructed under this plan will not impact prime farmland and will occur upon Kentucky state highway Right of Way which is previously disturbed. All work conducted outside of the right of way will be surveyed and studied appropriately prior to construction.

VI. Existing Wastewater Systems

ON-SITE TREATMENT SYSTEMS

The region is greatly populated with on-site septic tank systems. The results of this type of treatment within the service area have proven to be problematic. Many systems are failing due to inadequate percolation properties of the soil, shallow soils, or a need to renovate the leach fields and inadequate area to install new lines. There is currently no monitoring of these systems which creates an “out of sight out of mind” attitude towards sewage treatment. Since most homes in the service area are located within the floodplain or directly adjacent to tributary streams, all septic tank failures and related sewage leaks are being conveyed and eventually discharged directly into the streams. See attached letter from the Knott County Health Department regarding failing septic systems.

EXISTING TREATMENT FACILITIES

There are only two public treatment facilities within the project area: The Ball Creek WWTP and the City of Hindman WWTP. As stated previously the City of Hindman’s WWTP and system is not included because it serves a separate approved planning area. It should be noted however, that the WWTP is outside the approved planning area.

The Ball Creek WWTP is a new Sequential Batch Reactor Treatment Facility constructed by the Troublesome Creek Environmental Authority. This was TEA’s pilot project and included the construction of the WWTP and roughly 6 miles of gravity and force main sewer collection systems. This project was located in the head of the watershed and represents TEA’s first step in treating the sewage within the service area. Construction was completed in early 2011 and has since been treating customers within the Ball Creek community of Knott County. As part of TEA’s future plan, ownership and operation has been transferred to the local water district. It is currently owned and operated by Knott County Water and Sewer District.

The Ball Creek WWTP consists of a comminutor at the headworks of the plant which removes solids from the influent, a 50,000 gallon pre-equalization basin, two (2) SBR treatment basins at 50,000 gallons each, a 50,000 gallon digester basin, an ultraviolet disinfection system, a post aeration basin, and a haul-away sludge dewatering container. The plant is currently permitted and calibrated to treat 100,000 gallons per day and has the capability of being calibrated to treat roughly 300,000 gallons per day. The facility’s site has ample space for future expansion and was designed with expansion in-mind. Redundancy was designed throughout and includes two SBR basins, two transfer pumps, and two UV canisters. This facility is currently operating well below capacity and is experiencing no compliance issues. All components of this plant are new and functioning properly. Operations of the plant are fully automated and require significantly less direct attention from an operator.

Since this facility was constructed with expansion in-mind a large portion of this Regional Facility Plan includes collection expansion throughout Knott and Perry counties that will be served by this existing WWTP. See attached maps.

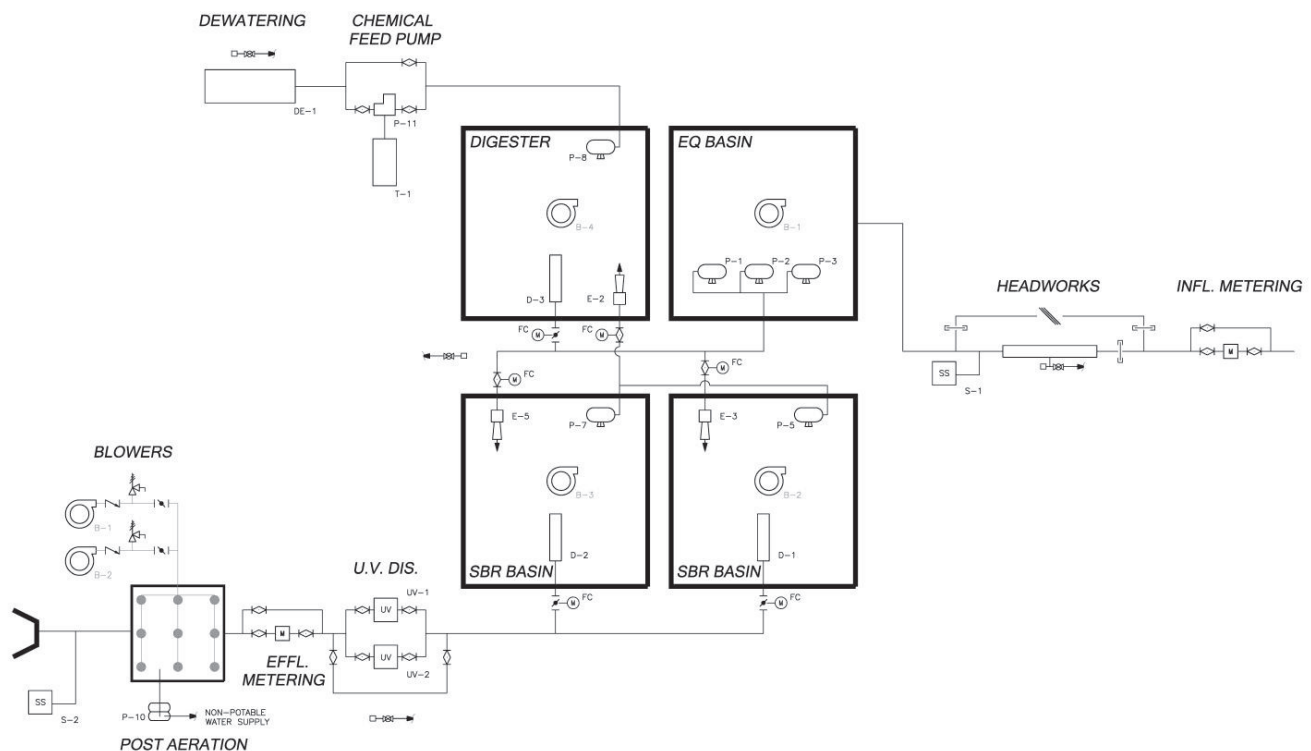
The existing Ball Creek WWTP has the following design parameters, as well as those parameters listed in TABLE VI-A:

PROCESS DESIGN DATA FOR BALL CREEK SBR WWTP

A. Design Parameters

- | | |
|-----------------------------|-------------|
| • Design Flow Q_{AVG} | 100,000 GPD |
| • Peak Flow Q_{AVG} | 300,000 GPD |
| • Future Peak Instantaneous | 2.3 MGD |
| • Number of SBR Basins | 2 |

The existing Ball Creek Collection System includes approximately 1.0 mile of gravity sewer and 5.0 miles of force main. The gravity sewer portion consists of 12" PVC and is capable of serving many commercial and/or residential developments at the Chestnut Ridge Development Site in Knott County. The force main was constructed using 6" HDPE and consists of one regional 200 GPM lift station and numerous residential grinder stations. The process schematic is shown below:



There are numerous package treatment facilities within the service area. Most are designed to handle flows of one building such as an existing elementary school. The Phoenix Place Package Treatment Facility serves a residential development. This Regional Facility Plan includes plans to remove these package treatment facilities from operation, collect the sewage with a new collection system and treat the sewage at one of the proposed regional facilities.

A listing of the existing wastewater treatment facilities within the planning area is shown in Table VI-A.

As shown within Table VI-B Residual Solids (sludge) Handling is accomplished at Ball Creek by the same method as the various packaged plants. The packaged plants pump liquid waste sludge and disposal is accomplished by the certified pumpers/haulers. Note solids handling for the proposed facilities is to be on site drying and landfill.

TABLE VI-A

Existing Treatment Facilities within the TEA Planning Area

BREATHITT CO.				
NAME	PERMIT	TYPE	SIZE(MGD)	AGE
Marie Roberts-Caney Elementary School	KY0083178	Pkg.-act. Sludge, Eq, extend. aeration, Settling, Disinfect	0.009	>7yr
PERRY CO.				
NAME	PERMIT	TYPE	SIZE(MGD)	AGE
Robinson Elementary School	KY0093572	Pkg.-act. Sludge, extend. aeration, Settling, Disinfect	0.008	>7yr
KNOTT CO.				
NAME	PERMIT	TYPE	SIZE(MGD)	AGE
Phoenix Prop. Owners Association	KY0090832	Pkg.-act. Sludge, screen, extend. aeration, Settling, Disinfect, post air	0.04	Orig. 1988
Emmalena Elementary School	KY0083101	Pkg.-act. Sludge, extend. aeration, Settling, Disinfect	0.005	>7yr
Beckham Combs Elementary School	KY0087921	Pkg.-act. Sludge, extend. aeration, Settling, Disinfect	0.005	>7yr
Ball Creek WWTP	KY0107956	SBR, Dry sludge to landfill	0.10	4 yr

TABLE VI-B
SLUDGE DISPOSAL METHODS
Of

Existing Treatment Facilities within the TEA Planning Area

BREATHITT CO.			
NAME	PERMIT	TYPE	CONTRACTOR
Marie Roberts-Caney Elementary School	KY0083178	Liquid Pumped & Hauled	Ed's Septic Service Beattyville, KY. 41311 606-464-8521
PERRY CO.			
NAME	PERMIT	TYPE	CONTRACTOR
Robinson Elementary School	KY0093572	Liq. Pumped & Hauled	Double L Construction Scuddy, Ky. 41760 606-476-2166
KNOTT CO.			
NAME	PERMIT	TYPE	CONTRACTOR
Phoenix Prop. Owners Association	KY0090832	Liq. Pumped & Hauled	B&C Septic Tank Service Emmalena, Ky. 41740 606-785-5552
Emmalena Elementary School	KY0083101	Liq. Pumped & Hauled	B&C Septic Tank Service Emmalena, Ky. 41740 606-785-5552
Beckham Combs Elementary School	KY0087921	Liq. Pumped & Hauled	B&C Septic Tank Service Emmalena, Ky. 41740 606-785-5552
Ball Creek WWTP	KY0107956	Liq. Pumped & Hauled	B&C Septic Tank Service Emmalena, Ky. 41740 606-785-5552

VII. Forecast of Flows & Waste Loads in the Planning Area

As discussed earlier in this report the current total population within the service area is 9,918. This results in a total potential customer count of 3,800. There are currently two proposed WWTP's included with this Regional Facility Plan; the Homeplace Clinic WWTP located in Perry County and the Riverside WWTP located in Breathitt County. The existing Ball Creek WWTP, located in Knott County, is also part of this plan.

TEA intends to fund and construct three (3) plants within this service area and construct many miles of collection system to serve the population. At the completion of the construction of facilities in Knott, Perry and Breathitt counties, the Troublesome Creek Environmental Authority board will turn over operations of the constructed facilities to the respective county water and sewer districts, i.e., Knott County Water and Sewer District, Perry County Water and Sewer District and the Breathitt County Water and Sewer District. TEA turned over operations and maintenance of the Ball Creek WWTP and Collection System to KCWSD in mid 2013. Please be advised that TEA and Knott County Water & Sewer District has filed an application with the PSC under Chapter 278.218, "Transfer of Control of Assets" and that process is currently pending approval. TEA plans to transfer future infrastructure assets built to the county agencies mentioned above in the future. TEA will be a planning and development entity only, operations will not be a part of its mission. The potential customer count for each plant is: the Riverside WWTP would serve approximately 700 customers, the Ball Creek WWTP would serve approximately 850 customers and the Homeplace WWTP would serve approximately 2,250 customers.

The projected current and future flows for each plant are as follows:

RIVERSIDE WWTP

Projected Current Customers = 700
Flow per Customer per Day = 300 GPD
Total Projected Current Flow = 210,000 GPD
Peak Projected Current Flow = 840,000 GPD
Projected Current BOD₅ Loading = 310 lb/day (177 mg/l)
Projected Current TSS Loading = 366 lb/day (209 mg/l)
Projected Future Customers = 640
Flow per Customer per Day = 300 GPD
Total Projected Future Flow = 192,000 GPD
Peak Projected Future Flow = 768,000 GPD
Projected Current BOD₅ Loading = 284 lb/day (177 mg/l)
Projected Current TSS Loading = 335 lb/day (209 mg/l)

BALL CREEK WWTP

Projected Current Customers = 800
Flow per Customer per Day = 300 GPD
Total Projected Current Flow = 240,000 GPD
Peak Projected Current Flow = 960,000 GPD
Projected Current BOD₅ Loading = 355 lb/day (177 mg/l)
Projected Current TSS Loading = 418 lb/day (209 mg/l)

Projected Future Customers = 720
Flow per Customer per Day = 300 GPD
Total Projected Future Flow = 216,000 GPD
Peak Projected Future Flow = 864,000 GPD
Projected Current BOD₅ Loading = 320 lb/day (177 mg/l)
Projected Current TSS Loading = 376 lb/day (208 mg/l)

HOMEPLACE WWTP

Projected Current Customers = 2,250
Flow per Customer per Day = 300 GPD
Total Projected Current Flow = 675,000 GPD
Peak Projected Current Flow = 2,700,000 GPD
Projected Current BOD₅ Loading = 998 lb/day (177 mg/l)
Projected Current TSS Loading = 1175 lb/day (209 mg/l)

Projected Future Customers = 2,025
Flow per Customer per Day = 300 GPD
Total Projected Future Flow = 607,500 GPD
Peak Projected Future Flow = 2,430,000 GPD
Projected Current BOD₅ Loading = 899 lb/day (177 mg/l)
Projected Current TSS Loading = 1057 lb/day (208 mg/l)

NOTE: The anticipated population decline may turn into growth after public sanitary sewer is available to the residences. Residential and/or commercial developments may increase due to the newly available public sanitary sewer system.

Design criteria for each plant will be based on the loadings presented as well as KPDES limits as presented below based on the Waste Load Allocation (WLA).

Effluent Design Parameters

<u>Parameter</u>	<u>Limit</u>
Carbonaceous Biochemical Demand	25 mg/l
Total Suspended Solids	30 mg/l
Ammonia-nitrogen	15 mg/l
Dissolved Oxygen	7 mg/l
Total Phosphorus	Monitor
Total Nitrogen	Monitor
Reliability classification	Grade C

VIII. Evaluation of Alternatives

NO ACTION ALTERNATIVE

The No Action Alternative will provide no effort to clean the streams and environment within the service area; resulting in continued public health hazards and polluted streams. Troublesome Creek will remain impaired. The water qualities within the streams will never acquire high-quality standards resulting in the depletion of environmental conditions, living standards and conditions, and further degradation of health and attitudes within the entire service area. Property values and population will continue to fall.

OPTIMIZATION OF EXISTING FACILITIES

As stated previously, there is one active regional WWTP within the proposed service area. The Ball Creek WWTP is a new plant and is optimized as much as possible. This plant's effectiveness is the lack of collection system that can carry the sewage to the plant for processing. Included in this plan is the proposal to extend collection facilities throughout the majority of the watershed, collect the sewage and convey it to a new or existing WWTP within the service area for processing.

REGIONALIZATION

Regionalization is the desired goal of the Troublesome Creek Environmental Authority, as evidenced by the inclusion of the entire watershed within the plan. The entity was formed to address the issue of water quality within the Troublesome Creek watershed. For this reason, TEA is formed as a joint union between Breathitt, Knott and Perry Counties. This approach from an implementation standpoint is the most logical and economical. Staying within one watershed will decrease the amount of lift stations needed to cross watershed boundaries. This formation also creates a three-county partnership, allowing each to seek funding jointly and/or individually for a common goal.

Regionalizing this service area allows TEA to continue to seek funds and develop plans to stem the decline of Troublesome Creek. Regionalization will include the construction and/or operation of multiple treatment facilities within the service area, lift stations, collection systems, etc. as shown on the attached maps. The infrastructure TEA provides will be constructed in accordance with all federal, state and local regulations. The WWTP system TEA has selected as the most cost effective to implement and construct is a Sequential Batch Reactor (SBR) like the Ball Creek WWTP. The advantage of this plant is its small footprint and high water quality effluent. A major advantage of the SBR WWTP is that it can easily be expanded while occupying a small footprint. The current Ball Creek Facility has provided an excellent source of experience for the current operations staff that can readily be passed on, and used to start-up and steepen the learning curve for operators at the other proposed facilities.

Other advantages of the SBR process are:

- High quality effluent consistently achieved at widely varying flows,
- No primary or secondary clarifiers which reduces space requirements and fewer mechanical parts means less maintenance,
- No sludge recycling, decreased capital and O&M costs,
- Odor control is minimal, if at all.
- Simultaneous Nitrification/Denitrification is inherent to process control system and is accomplished without extra equipment, or energy
- Phosphorus is biologically removed, to the maximum extent possible reducing the need for chemical addition
- Improved settling provided under perfect quiescent conditions,
- Reduced labor costs through automated controls,
- Power savings due to lower oxygen requirements,
- Decanter eliminates solids carry-over into the effluent,
- Acclimated biomass stabilization under shock BOD loads and large flow variations, and
- Heat conservation optimizes winter operation.

TREATMENT ALTERNATIVES

Several treatment processes were considered and some quickly discounted and not given further consideration or evaluation. These included anaerobic and community on-site (sub-surface) treatment and disposal (cluster system), irrigation or land application of treated effluent, individual on-site treatment and disposal schemes. These were not evaluated further due to the lack of suitable or available land. Deep well injection was not evaluated or considered further due to possible contamination of drinking water well contamination.

ALTERNATIVE TREATMENT PROCESS A: SEQUENCING BATCH REACTOR (SBR) TREATMENT PROCESS**INFLUENT SCREENING**

Coarse screens will not be necessary since all solids will have been processed by a grinder station prior to arriving at the WWTP. This wastewater screen serves as a grinder, fine screen, and a compactor. First, a grinder shreds all clumps of rags and long stringy material. Next, the solids are captured by a perforated plate screen and removed by a rotating auger. As the solids are removed, dual wash water zones clean-off fecal material. The rotating auger then conveys solids to the discharge point where the integrated compactor squeezes out water before depositing the cleaned and dried material into a dumpster. The cleaner discharge keeps odors to a minimum and lowers disposal costs, as less water and fecal material are sent to the landfill. A bypass will also be installed with manually cleaned bar screens.

SBR PROCESS

During **Anoxic Fill**, the basin is loaded with food from the influent through an influent distribution manifold which creates a high food to microorganism (F/M) ratio with zero dissolved oxygen (DO) conditions. The fill period is primarily anoxic, or without aeration. Aeration is usually initiated late in the fill period, and continues in the react period, after the influent flow has been diverted to another basin. The influent manifold allows intimate contact of the influent (food) with the settled biomass in the sludge blanket throughout the length of the basin. During this time, the soluble BOD is absorbed and stored by the facultative biomass until air is received to metabolize the food. The selective pressures exhibited on the biomass of zero DO in Anoxic Fill allows good settling, facultative organisms to predominate.

After about 75% of the fill period is complete, the blowers and pumps are automatically turned on to provide air and complete mixing which initiates the “feast” environment for the biomass. The biomass begins to metabolize the food they have absorbed. They utilize the oxygen provided very rapidly with high DO uptake rate and low residual DO values. It is during the initial stages of **Aerated Fill** that both Nitrification and Denitrification occur. The ammonia is converted to nitrates within the highly aerated plume of the jet. The nitrates are converted to nitrogen gas in the low DO areas of the basin. The denitrifying organisms use the BOD as a food source and the oxygen off the nitrates converting the nitrates to nitrogen gas.

React begins after the basin has completed filling, and the influent flow has been diverted to another SBR tank. No more food (influent) enters the reactor basin during React. This forces the organisms to scour for any remaining BOD. Aeration continues in the full reactor until complete biodegradation is achieved; mixed liquor is drawn through the manifold and used as motive liquid for the aerator. React continues until the food is consumed and the biomass enters its “famine” state.

True react is critical to achieve intense famine conditions for optimum organism selection. Tests have shown that the food is consumed when the residual DO begin to rise quickly. The biomass is allowed to **settle** in perfect quiescent conditions; no influent is introduced during settle and no effluent is decanted. Since the reactor is under true quiescent conditions during settle, 100% of the reactor capacity is available for liquid/solids separation. The relative loading rate during clarification is zero for the batch reactor.

Following the settle cycle the effluent withdrawal or **Decant** cycle begins. Decant is initiated by opening an automatic valve. Treated effluent is discharged through a decanter from approximately 18 inches below the surface, avoiding discharge of any surface contaminates. Decant continues until approximately the upper 1/3 of the basin is discharged.

While the reactor waits in **idle** to receive flow, settle sludge is drawing through the manifold and pumped to the digester. The jet motive liquid pump is utilized as a waste sludge pump. The settled sludge is withdrawn through the sludge collection manifold, which runs the length of the basin. The multi-point sludge withdrawal yields the thickest sludge possible, reducing side stream sludge treatment operation and maintenance.

ULTRAVIOLET DISINFECTION

Disinfection of the effluent will be provided as necessary to meet the Wasteload Allocation (WLA) appointed to each plant by the Kentucky Division of Water. The system uses low-pressure, low output lamps.

POST AERATION

Post Aeration with a concrete basin, blowers, and diffusers will be provided to assure that a safe and habitable level of oxygen is available in the final effluent prior to discharging into the receiving stream(s).

SLUDGE HANDLING

The resulting volume of sludge will be processed by a transportable sludge dewatering container with media fabric and chemical polymer system. The transportable dewatering container is a dewatering system that removes moisture from the sludge and produces a cake that can easily be transported from the site by truck.

The consistent slurry from the sludge source is pulled to the dewatering system by an adjustable, positive displacement pump. The feed pump is used to meter the slurry at a consistent rate to the press. Polymer is diluted in the feed/blend system to approximately 0.2 – 1.0% with water then injected after the feed pump but prior to the pneumatic adjustable mix valve, into the required polymer/slurry mixing energy for the optimum floc formation. As the slurry is pushed by the feed

pump through the retention piping, it is given time to thoroughly mix to flocculate a slurry before it reaches the press. The operator has the option to open the slurry by-pass valve which allows for the slurry to be sent back to the process source until the proper floc formation is reached. Once proper floc formation is reached, the press feed valves can be opened, sending the slurry to the Rotary Fan Press.

The cake will be transported by truck as needed to an approved land fill. Alternative sludge land uses will be researched to determine if the sludge can be applied for some environmentally enhancing benefit.

Since the Ball Creek Facility is currently operating, total cost estimates are only provided for the proposed new facilities. We have included the estimate to expand Ball Creek to a capacity of 0.25 MGD. The current Ball Creek Facility was constructed 2010 and 2011 at a cost of \$ 3.0 million for an ADF of 0.10 MGD.

TABLE VIII-A Treatment Alternative A – SBR Process Cost Estimate			
Unit Process	Facility Costs		
	Ball Creek	Riverside	Home Place
Headworks	\$ 1,500,00	\$ 320,000	\$ 450,000
Equalization	110,000	420,000	830,000
Aeration/Settling Tanks	520,000	1,400,000	2,200,000
Aeration Equipment	120,000	190,000	235,000
UV Disinfection	120,000	230,000	425,000
Sludge Handling/Drying	310,000	740,000	1,400,000
Admin./Oper./ Chem. Feed	80,000	340,000	580,000
Piping/Process Pumping	100,000	370,000	700,000
Site Work	190,000	490,000	680,000
Estimated Construction Costs	\$ 1,750,000	\$ 4,500,000	\$ 7,500,000
Present Worth	\$ 889,000	\$ 3,199,000	\$ 3,300,000
Item	Annual O, M & R Costs		
	Ball Creek	Riverside	Home Place
Chemicals	\$ 9,500	\$ 9,500	\$ 37,000
Power	38,000	39,000	125,000
Sludge Removal/Disposal	6,000	6,000	19,200
Labor (System)	184,000	180,000	450,000
Lab Testing	13,800	13,800	14,500
Parts/Replacement/Repair	19,200	19,200	45,600
Total Annual Costs	\$ 270,500	\$ 271,500	\$ 691,300
Present Worth	\$ 2,865,000	\$ 2,833,000	\$ 7,321,000

ALTERNATIVE TREATMENT PROCESS B: DEEP CELL FACULTATIVE LAGOONS**INFLUENT SCREENING**

Coarse screens will not be necessary since all solids will have been processed by a grinder station prior to arriving at the WWTP. This wastewater screen serves as a grinder, fine screen, and a compactor. First, a grinder shreds all clumps of rags and long stringy material. Next, the solids are captured by a perforated plate screen and removed by a rotating auger. As the solids are removed, dual wash water zones clean-off fecal material. The rotating auger then conveys solids to the discharge point where the integrated compactor squeezes out water before depositing the cleaned and dried material into a dumpster. The cleaner discharge keeps odors to a minimum and lowers disposal costs, as less water and fecal material are sent to the landfill. A bypass will also be installed with manually cleaned bar screens.

FACULTATIVE LAGOON

This process involves typical screening of the raw influent with compaction and dewatering of the removed solids. Dual lagoons, each sized to provide a minimum of 3.5 times the ADF (30 days minimum sludge detention) with surface (shallow) aeration and a depth of 22 feet minimum are needed. Disinfection follows via high intensity ultraviolet contact. The outstanding advantage of this process is that sludge removal is virtually non-existent. Experience yields that typically on 5 to 10 year cycles, biosolids are removed. This quantity typically is 40 to 50 cubic yards per 1 MGD of ADF, with many installations removing significantly less.

PACKED TOWER

A packed tower (trickling filter type) follows the lagoons to provide specialized nitrogen removal if the anoxic zone of the lagoons is upset.

CLARIFICATION

Dual clarifiers follow the packed towers each clarifier is provided with an inner ring to provide a mixing zone for alum addition to assist with phosphorus removal should removal of that nutrient become a requirement. Settled sludge is returned to the deep cell lagoons.

ULTRAVIOLET DISINFECTION

Disinfection of the effluent will be provided as necessary to meet the Wasteload Allocation (WLA) appointed to each plant by the Kentucky Division of Water. The system uses low-pressure, low output lamps.

POST AERATION

Post Aeration with a concrete basin, blowers, and diffusers will be provided to assure that a safe and habitable level of oxygen is available in the final effluent prior to discharging into the receiving stream(s).

TABLE VIII-B Treatment Alternative B – Facultative Lagoons Cost Estimate		
Unit Process	Facility Costs	
	Riverside	Home Place
Headworks	\$ 300,000	\$ 450,000
Deep Cell Lagoons (2)	800,000	2,600,000
Packed Towers (2)	450,000	900,000
Clarifiers (2)	325,000	900,000
UV Disinfection	230,000	425,000
Admin./Oper./ Chem. Feed	340,000	580,000
Piping/Process Pumping	300,000	990,000
Site Work	1,835,000	2,300,000
Estimated Construction Costs	\$ 4,580,000	\$ 91,145,000
Present Worth	\$ 3,246,000	\$ 4,024,000
Item	Annual O, M & R Costs	
	Riverside	Home Place
Chemicals	\$ 8,000	\$ 38,000
Power	35,000	140,000
Sludge Removal/Disposal	6,000	19,500
Labor (System)	190,000	450,000
Lab Testing	15,000	12,000
Parts/Replacement/Repair	18,000	18,000
Total Annual Costs	\$ 272,000	\$ 677,500
Present Worth	\$ 2,880,000	\$ 7,175,000

ALTERNATIVE TREATMENT PROCESS C: OXIDATION DITCH**INFLUENT SCREENING**

Coarse screens will not be necessary since all solids will have been processed by a grinder station prior to arriving at the WWTP. This wastewater screen serves as a grinder, fine screen, and a compactor. First, a grinder shreds all clumps of rags and long stringy material. Next, the solids are captured by a perforated plate screen and removed by a rotating auger. As the solids are removed, dual wash water zones clean-off fecal material. The rotating auger then conveys solids to the discharge point where the integrated compactor squeezes out water before depositing the cleaned and dried material into a dumpster. The cleaner discharge keeps odors to a minimum and lowers disposal costs, as less water and fecal material are sent to the landfill. A bypass will also be installed with manually cleaned bar screens.

OXIDATION DITCH

The process is a variety of the extended aeration process which utilizes the flow of the mixed liquor within the concentric circle or elongated “racetrack” configuration to provide the aerobic, anoxic, and anaerobic zones to accomplish the nutrient oxidation/digestion/removal of BOD and Nitrogen. Ditches are sized to provide a minimum of 24 hours detention time. They are typically preceded by standard screening and dewatering headworks, equalization and flow measurement. Aeration and motive force can be applied by either “paddle wheels” or brushes, or it may be done with diffused air and submerged propeller mixers.

CLARIFICATION

The ditches are followed by standard circular clarifiers, with added mix zones, for chemical additions. Settled sludge is recycled back to the head of the ditches or to separate sludge digesters.

ULTRAVIOLET DISINFECTION

Disinfection of the effluent will be provided as necessary to meet the Wasteload Allocation (WLA) appointed to each plant by the Kentucky Division of Water. The system uses low-pressure, low output lamps.

POST AERATION

Post Aeration with a concrete basin, blowers, and diffusers will be provided to assure that a safe and habitable level of oxygen is available in the final effluent prior to discharging into the receiving stream(s).

SLUDGE HANDLING

Sludge digestion is accomplished with the addition of large quantities of air over an extended period of time. The resulting volume of sludge will be processed by a transportable sludge dewatering container with media fabric and chemical polymer system. The transportable dewatering container is a dewatering system that removes moisture from the sludge and produces a cake that can easily be transported from the site by truck.

The consistent slurry from the sludge source is pulled to the dewatering system by an adjustable, positive displacement pump. The feed pump is used to meter the slurry at a consistent rate to the press. Polymer is diluted in the feed/blend system to approximately 0.2 – 1.0% with water then injected after the feed pump but prior to the pneumatic adjustable mix valve, into the required polymer/slurry mixing energy for the optimum floc formation. As the slurry is pushed by the feed pump through the retention piping, it is given time to thoroughly mix to flocculate a slurry before it reaches the press. The operator has the option to open the slurry by-pass valve which allows for the slurry to be sent back to the process source until the proper floc formation is reached. Once proper floc formation is reached, the press feed valves can be opened, sending the slurry to the Rotary Fan Press.

Waste dried sludge is expected to amount to approximately 5.0 cubic yard per week per 1.0 MGD. The cake will be transported by truck as needed to an approved land fill. Alternative sludge land uses will be researched to determine if the sludge can be applied for some environmentally enhancing benefit.

TABLE VIII-C Treatment Alternative C – Oxidation Ditch Cost Estimate		
Unit Process	Facility Costs	
	Riverside	Home Place
Headworks	\$ 200,000	\$ 450,000
Equalization	310,000	830,000
Oxidation Ditches (2)	1,120,000	2,580,000
Clarifiers (2)	430,000	900,000
UV Disinfection	230,000	425,000
Sludge Digestion (2)	440,000	890,000
Sludge Dewatering/Drying	425,000	810,000
Piping/Process Pumping	320,000	990,000
Admin./Oper./ Chem. Feed	290,000	580,000
Site Work	760,000	1,420,000
Estimated Construction Costs	\$ 4,525,000	\$ 9,875,000
Present Worth	\$ 3,223,000	\$ 4,345,000
Item	Annual O, M & R Costs	
	Riverside	Home Place
Chemicals	\$ 10,600	\$ 38,500
Power	48,000	140,000
Sludge Removal/Disposal	6,000	19,200
Labor (System)	184,000	570,000
Lab Testing	13,800	14,500
Parts/Replacement/Repair	19,200	45,600
Total Annual Costs	\$ 281,600	\$ 827,800
Present Worth	\$ 2,982,000	\$ 8,766,000

RECOMMENDED ALTERNATIVE

Buildable, developable land within the planning area is in a “nonexistent” state of supply. Slopes throughout the area make land application impossible and reasonably sloping land is typically in the floodplain. This is the same situation that places a financial burden on alternative treatment processes that have larger footprints, such as lagoons or oxidation ditches. When land even remotely developable for lagoons or oxidation ditches is located, the acquisition costs, and more importantly, the grading and development costs are totally prohibitive.

The recommended alternative is considered regionalization, but in a decentralized arrangement. This alternative best fits the goals of TEA, the welfare of the public, and the environment; and produces the opportunity for future advancement and development both economically and socially within the service area. This alternative requires TEA to construct two (2) WWTPs and expand an existing WWTP, along with many miles of accompanying sewer collection lines (both gravity and force main) throughout the entire watershed. This effort will greatly reduce the concentration of coliform bacteria in Troublesome Creek and its tributaries and assist in removing the stream(s) from the impaired stream list. The institutional arrangements have already been established through an interlocal agreement between Knott, Perry and Breathitt Counties. Completion of the projects described within this plan will eliminate straight pipe discharges into the streams, eliminate failing septic systems, and eliminate the need for the package treatment facilities located within the watershed.

All infrastructure proposed and/or constructed as part of this plan will fully conform to the design criteria promulgated by the most current standards of the Kentucky Division of Water, Ten States Standards, and/or other applicable regulatory agencies, governing said design at the time of initiation of design.

Table VIII-D provides a comparison of the cost estimates for the three evaluated treatment processes and the associated Operation, Maintenance and Replacement (OM&R) costs and the present worth for each alternative. Table VIII-E provides an evaluation and ranking of the three processes.

TABLE VIII-D Treatment Alternatives Cost Comparison						
Process	Riverside			Home Place		
	SBR	Lagoon	Ox. Ditch	SBR	Lagoon	Ox. Ditch
Headworks/Equalization	740,000	300,000	510,000	128,000	450,000	1,280,000
Secondary Treatment	1,590,000	1,575,000	1,550,000	2,435,000	4,400,000	3,480,000
UV Disinfection	230,000	230,000	230,000	425,000	425,000	425,000
Sludge Handling/Dewatering	740,000	--	865,000	1,400,000	--	1,700,000
Piping/Pumping	370,000	300,000	320,000	700,000	990,000	990,000
Admin./Oper./ Chem. Feed	340,000	340,000	290,000	580,000	580,000	580,000
Site Work	490,000	1,835,000	760,000	680,000	2,300,000	1,420,000
Estimated Construction Costs	4,500,000	4,580,000	4,525,000	7,500,000	9,145,000	9,875,000
Salvage Value	1,125,000	1,145,000	1,131,250	1,875,000	2,286,250	2,468,750
Estimated Annual O&M Costs	271,500	272,000	281,600	691,300	677,500	827,800
O&M Present Worth Costs	2,833,000	2,880,000	2,982,000	7,321,000	7,175,000	8,766,000
Net Present Worth	\$ 6,208,000	\$ 6,315,000	\$ 6,375,750	\$12,946,000	\$14,033,750	\$16,172,250

Salvage Value for the study was assumed to be 25% at the 20 year life of study.

TABLE VIII-E Treatment Alternatives Ranking							
	No Action	Riverside			Home Place		
		SBR	Lagoon	Ox. Ditch	SBR	Lagoon	Ox. Ditch
Optimization of Existing Facilities	1	10	9	9	10	9	9
Regionalization	1	10	10	10	10	10	10
Net Present Worth	10	9	8	7	9	8	7
Salvage Value	1	6	6	6	6	6	6
Implementability	1	10	9	9	10	9	9
Environmental Impact	1	9	9	9	9	9	9
Existing O&M Experience	1	10	7	7	10	7	7
User Rates	10	9	8	7	9	8	7
Public Acceptance	1	9	9	9	9	9	9
TOTAL SCORE	27	82	75	73	82	75	73

Ranking of 1 through 10; 1 being the least desirable/beneficial, 10 being the most desirable/beneficial.

As the information presented demonstrates, the preferred alternative is a decentralized system utilizing three (3) major wastewater treatment facilities of the sequential batch reactor type, coupled with a collection and conveyance system comprised of a combination of gravity sewer, major system pumping stations with force mains, and small diameter pressure sewers with individual grinder pump installations. The very sparsely populated areas will continue to rely on and be served by on-site treatment and infiltration systems.

For this planning document all collection/conveyance systems were assumed to be the same. A mix of gravity sewers ranging in size from 8 to 12 inches in diameter, system force mains ranging in size from 4 to 6 inches in diameter, system pumping stations of the duplex or triplex (for flow matching) configuration and small diameter pressure sewers of 1.5 to 3 inch diameter with grinder pumps at the point of service. For the cost projections, gravity sewers with manholes were estimated at \$98.00/LF, system pump stations were estimated at \$185,000.00 each, system force mains were estimated at \$48.00/LF, pressure sewers were estimated at \$30.00/LF, and grinder pumps were projected at \$4,200.00 each.

IX. Cross-Cutter Correspondence & Mitigation

Cross Cutter Correspondence is attached as Appendix A.

The following actions will be taken in response to the comments, recommendations, and/or requests made by the Cross Cutter Agencies.

KENTUCKY HERITAGE COUNCIL; A Cultural Historic Survey and an Archeological Survey will be completed by a qualified professional prior to project implementation. Separate reports documenting the results will be submitted to the State Historic Preservation Officer for review, comment and approval.

KENTUCKY DEPARTMENT OF FISH AND WILDLIFE RESOURCES; Strict Erosion Control Measures and Best Management Practices requirements will be specified and required of any/all construction activities associated with the projects contained herein. It is not anticipated that any works will be accomplished with the Robinson Forest thus no impact is anticipated on the streams therein. Therefore no impact is anticipated on the Outstanding State Resource Waters and Reference Reach Waters in that area. KDFWR is responsible for three mitigation projects Balls Fork, Terry's Branch, and Laurel Fork within the Troublesome Creek Basin. Prior consultation with KDFWR will be done before any projects in those areas are planned in order to avoid impact to those projects. In areas where bats are known to occur, surveys will be conducted in order to avoid those areas if possible. Timing of construction will be done to result in the least possible impact on the bats.

Any stream crossings or parallel construction will be done at low flow periods and reclamation will be accomplished as soon as possible to minimize any stream bank impact, and to minimize an potential for erosion/siltation/sedimentation to best protect aquatic life. BMP will be required.

NRCS; As stated previously, to the maximum extent possible all lines will be constructed within existing road right of way, and in previously disturbed areas. However, NRCS will be requested to provide input on any projects proposed.

DEPARTMENT OF THE INTERIOR FISH AND WILDLIFE SERVICE; As stated previously in connection with the KDFWR response bat surveys will be accomplished to minimize impacts on maternity, swarming and roosting habitat of the Indiana bat. Seasonal schedules will be adhered to if any clearing is necessary within the habitat of the bat.

BMP and erosion measures as outlined above for the KDFWR response will be implemented to minimize any impact on aquatic life.

X. Evaluation of Recommended Regional Facility Plan

ENVIRONMENTAL IMPACTS

The environmental impacts anticipated in this plan are minimal. Collection lines will be installed in dug trenches typically along Kentucky Highway Right of Ways. Construction sites for the WWTPs will be thoroughly surveyed and examined by professionals to determine if important historical archeological sites are found or endangered species are found to inhabit the land. Appropriate measures and/or environmental permits will be acquired prior to commencing construction of any portion of this plan.

There are more negative environmental impacts present if this plan is not attempted and completed. This effort will greatly reduce the concentration of fecal coliform from Troublesome Creek and its tributaries and assist in removing the stream(s) from the EPA's impaired stream list. The institutional arrangements have already been established through the inter-local agreement between Knott, Perry and Breathitt Counties. Completion of the projects described within this plan will eliminate straight-pipe discharges into the streams, eliminate failing septic systems and eliminate the need for the package treatment facilities located within the watershed.

INSTITUTIONAL STRUCTURE

As stated previously, in August of 2006 TEA was formed as a non-profit entity through an inter-local agreement executed by the County Judge Executives of Knott, Perry, and Breathitt Counties. TEA's primary goal is improve the environment in and around Troublesome Creek, a shared resource among the founding counties. The entire Troublesome Creek watershed is approximately 246 square miles, or 158,000 acres, and covers the central portion of Knott County, the northeastern portion of Perry County, and the southeastern portion of Breathitt County. Troublesome Creek discharges directly into the North Fork of the Kentucky River at Haddix, Breathitt County, KY. The major tributaries that discharge into Troublesome Creek are Lost Creek, Buckhorn Creek, and Balls Fork (otherwise known as Ball Creek).

TEA has completed its pilot project known as the Ball Creek WWTP and Sanitary Sewer Collection System. The project included the construction of 0.10 MGD SBR WWTP and 6.0 miles of gravity and force main sanitary sewers. Today TEA owns and operates this plant successfully.

FUNDING PLAN

TEA intends to fund its ambitions by using its internal structure and management by each of the three counties; Breathitt, Knott and Perry. Each county will strive to contribute an amount of Coal Severance Funds towards the projects outlined in the plan according to the need and schedule as specified on the maps. KRADD was instrumental in assisting TEA with funding applications for the Ball Creek WWTP & Sanitary Sewer Collection Project and will continue to assist TEA with its future funding needs. Funds which will be sought are Coal Severance Funds, Multi-County Severance Funds, ARC, RD, USACE 531, Community Block Development Grants, etc.

CURRENT & PROJECTED USER RATES

User fees are currently set by the amount of potable water usage. The first 2,000 gallons of potable water used corresponds to a monthly sewer fee of \$28.50. Each additional 1,000 gallons of water used increases this monthly invoice by \$3.50. Therefore, a 4,000 gallon usage per month currently results in a \$35.50 usage invoice incurred by the user.

It is TEA's intention to provide public sanitary sewer to all residences within the service area at the lowest rate possible. The Public Service Commission regulates TEA's usage rates and will set them accordingly after future projects are developed and completed.

IMPLEMENTATION SCHEDULE

TEA intends to complete this plan according to the schedule shown on the attached map. The areas are divided into four (4) phases. Each phase area begins at the treatment facilities and extends out with mainlines. The main sewer lines must be completed first to provide a method of transporting sewage to these proposed plant sites. This plan is a regional plan and should be followed as close as possible to the master plan to maximize its effectiveness.

TABLE X-1 PLANNING PERIOD COST ANALYSIS and IMPLEMENTATION

SCHEDULE of SELECTED ALTERNATIVE

PERIOD	PROJECT(S)	CAPITAL COST	AREA
0-2 Years	Collection System	\$ 6,027,550.00	Riverside
	Treatment	\$ 2,500,000.00	WWTP Phase I
TOTAL ESTIMATED COST		\$ 8,527,550.00	
Present Worth		\$ 7.445 million	
2-5 Years	Collection System	\$ 2,025,000.00	Homeplace
	Treatment	\$ 3,000,000.00	WWTP Phase I
TOTAL ESTIMATED COST		\$ 5,025,000.00	
Present Worth		\$ 2.870 million	
5-10 Years	Collection System	\$ 19,000,000.00	Ball Creek Expansion WWTP
	Treatment	\$ 3,750,000.00	Riverside WWTP Expansion
TOTAL ESTIMATED COST		\$ 22,750,000.00	BC(1.75) Riverside (2.0)
Present worth		\$ 11.557 million	
10-20 Years	Collection System	\$ 29,500,000.00	Riverside WWTP Expan. (2.0)
	Treatment	\$ 4,500,000.00	Homeplace WWTP Expan.(2.5)
TOTAL ESTIMATED COST		\$ 34,000,000.00	Collection Expan. All Areas
Present Worth		\$ 8.772 million	

XI. Documentation of Public Participation

NOTICE OF PUBLIC HEARING

(Pursuant to 401KAR5:006 Sections 4 & 5; KRS-424, and 40 CFR 25, 5 & 6)

The Troublesome Creek Environmental Authority, 917 Perry Park RD, Hazard, KY 41701 has drafted a 20-year Regional Facilities Plan (RFP) containing wastewater requirements for collection and treatment and its cost, within the planning area, as described therein, to be served. Interested citizens may obtain further information including copies of the draft RFP by contacting Jennifer McIntosh at KY River Area Development District, located at the above address between the hours of 8:00A.M. and 4:00P.M. Monday through Friday.

A public hearing will be held on March 3, 2015 at 6:00 PM at the Kentucky River Area Development District Conference Center located at 917 Perry Park RD, Hazard, KY 41701. The purpose of the hearing is to discuss the draft plan and its contents, specifically the alternatives considered, project cost, financing sources, user charges and hook up/tap fees. This project may affect sewer rates in the future. The public is encouraged to attend this meeting and shall have a right to comment on the plan for a period of 30 days from the date of publication of this notice by writing to the Authority at the above address or before the termination of the hearing, whichever is later. A longer comment period may be requested in writing. All persons who believe any condition of the draft plan is inappropriate, inaccurate, incomplete, or otherwise not in the best interest of the public and the environment must raise all reasonable issues and submit all reasonable arguments, facts, and comments with supporting documents to the above given contact person.

APPENDIX A



P. O. Box 444
Hindman, Kentucky 41822
Telephone: (606) 785-5926
Fax: (606) 785-0244
E-mail: Info@rmje.net

3213 Summit Square Place
Suite 100
Lexington, Kentucky 40509
Telephone: (859) 543-1256
Fax: (859) 543-9873

November 25, 2014

Mr. Dave Baldridge
USACE Louisville District
Eastern Kentucky Regulatory Office
845 Sassafras Creek Road
Sassafras, KY 41759-8806

SUBJ: Troublesome Creek Environmental Authority
Regional Facility Plan

Dear Mr. Baldridge,

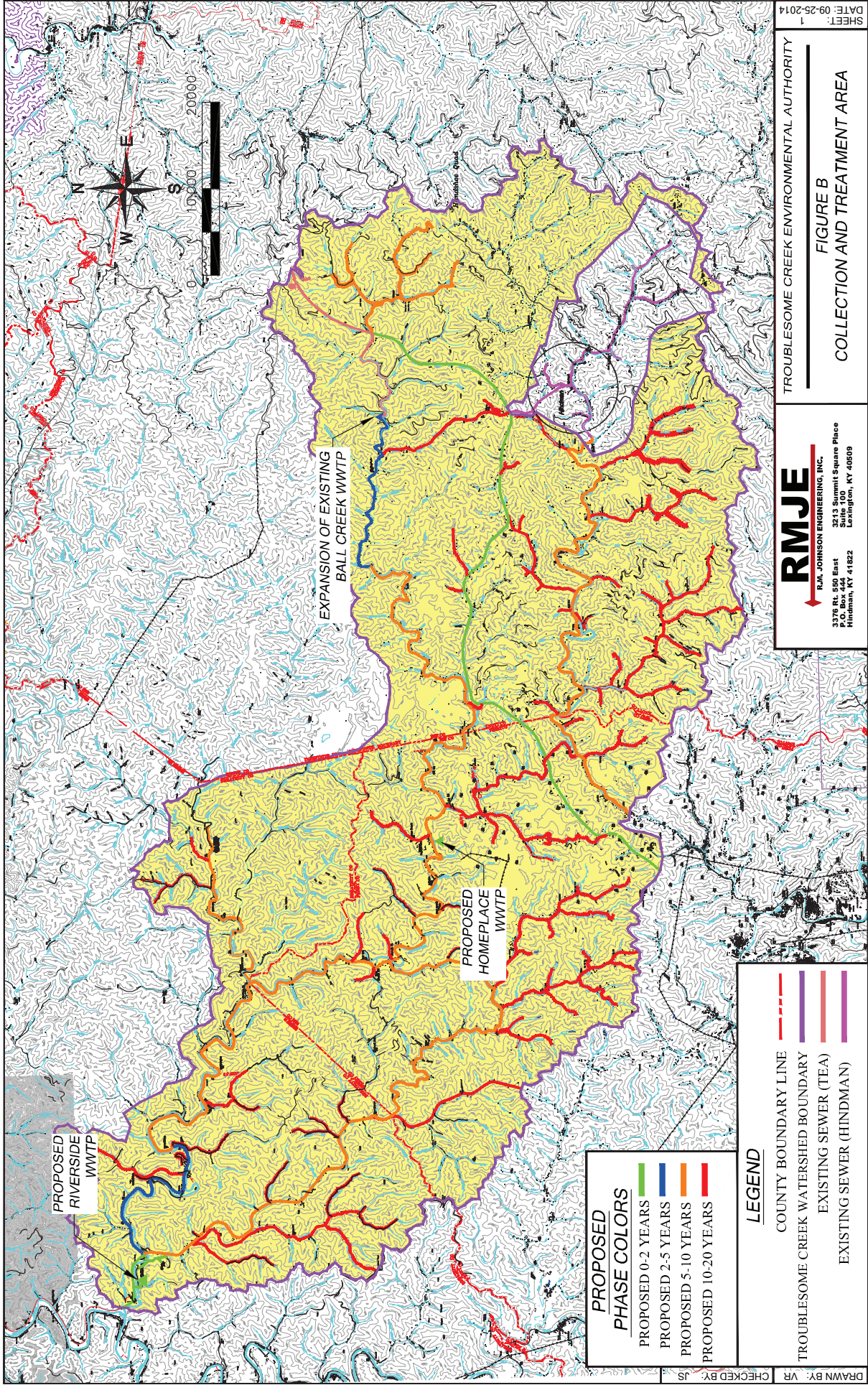
The Troublesome Creek Environmental Authority (TEA) is a non-profit entity created through an inter-local agreement executed by the County Judge Executives of Knott, Perry, and Breathitt Counties. TEA intends to submit a Regional Facility Plan to the Kentucky Division of Water to outline their goal of providing sanitary sewer facilities throughout the Troublesome Creek watershed in an effort to enhance the water quality of Troublesome Creek.

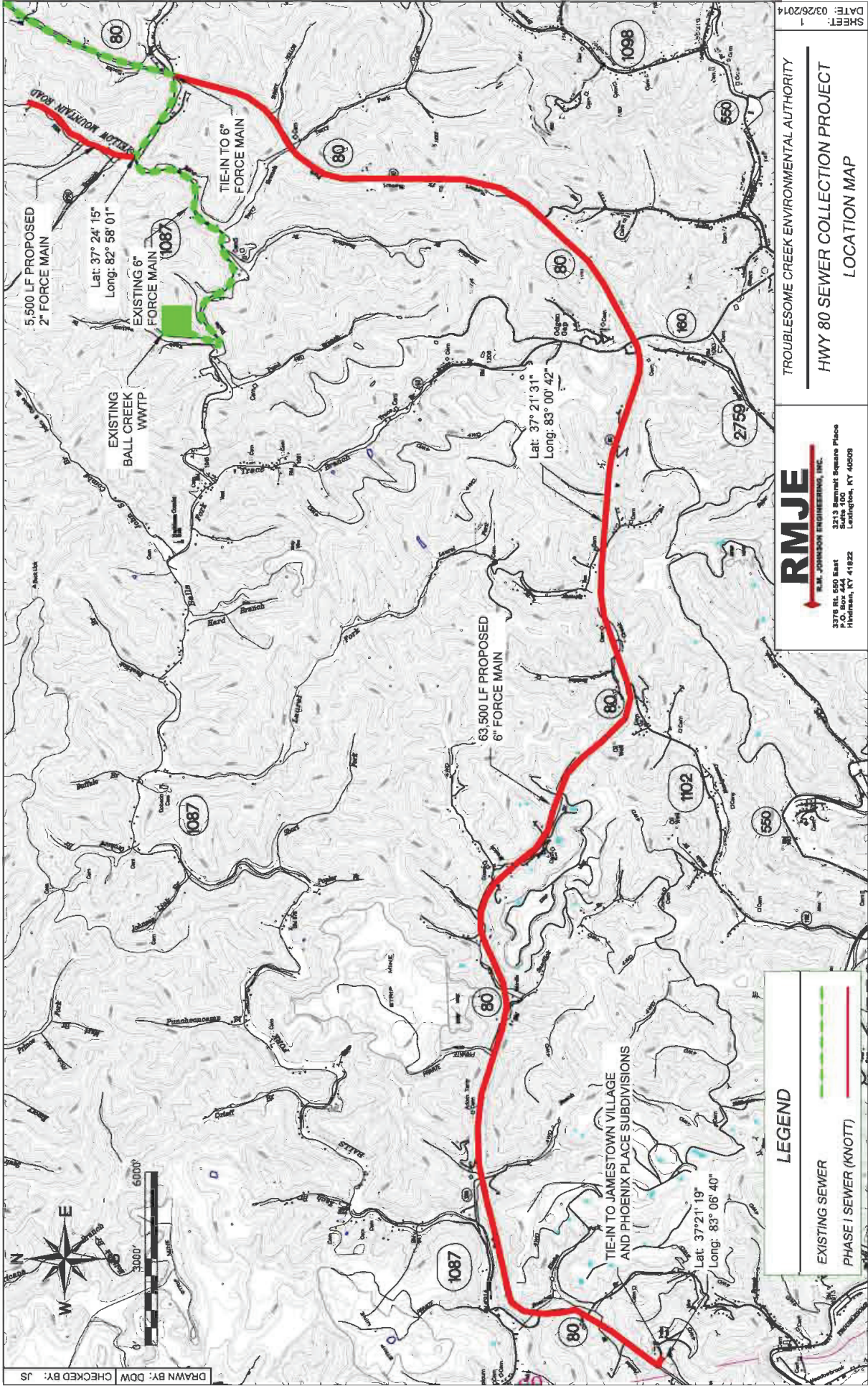
TEA proposes to construct, own and maintain wastewater treatment plants (WWTPs) strategically placed throughout the watershed to properly treat the sewerage, and sanitary sewer collection systems. A combination of gravity and force main collection systems are proposed throughout the region to collect the sewerage and transport it to the corresponding treatment facility. The gravity portions of the system will consist of a minimum pipe size of 8" and will be either PVC or ductile iron. The force main portion of the system will consist of a minimum of 2" and will be either PVC or HDPE and will require the installation of several regional lift stations. Customers located along the force main portions of the collection system will be connected to the main line using a residential grinder lift station which utilizes a 2" HDPE force main.

The attached map shows the Master Plan of the facilities. It includes preliminary locations of WWTPs, regional lift stations and the sanitary sewer collection systems. All of the stream crossings will be force mains and will be directionally bored. The only portion of the 201 facility plan that is projected for the next 2 years is the HWY 80 Sewer Extension Project. The HWY 80 project map is also attached. Please review and provide comment on any impacts these projects may have on wetlands and streams. Let us know if you have any questions. We would appreciate a response within 30 days if possible. Feel free to contact me at (859) 543-1256 extension 260 or by email at mscott@rmje.net. We appreciate the opportunity to work with you and look forward to your response.

Sincerely,
R.M. Johnson Engineering, Inc.

Michael Scott, EIT
Project Engineer





DRAWN BY: DDW
CHECKED BY: JS

LEGEND

EXISTING SEWER

PHASE I SEWER (KNOTT)



R.M. JOHNSON ENGINEERING, INC.
3378 Rt. 550 East
P.O. Box 444
Hartman, NY 41822

3215 Barnhart Square Place
Suite 100
Laurington, NY 40608

TROUBLESOME CREEK ENVIRONMENTAL AUTHORITY

HWY 80 SEWER COLLECTION PROJECT

LOCATION MAP

SHEET: 1
DATE: 03/26/2014



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
EASTERN KENTUCKY REGULATORY OFFICE
845 SASSAFRAS CREEK ROAD
SASSAFRAS, KY 41759-8806

December 12, 2014

Operations Division
Regulatory Branch (South)
ID No. LRL-2014-996

Mr. Michael Scott
RMJE, Inc.
P.O. Box 444
Hindman, KY 41822

Dear Mr. Scott:

This is in response to your letter requesting Corps of Engineers comments concerning the proposed construction associated with sanitary sewer facilities within the Troublesome Creek watershed along Rte 80 in Knott and Perry counties in conjunction with the Troublesome Creek Environmental Authority Regional Facility Plan. Please refer to File No. LRL-2014-996 in any future correspondence with us regarding this project.

Your proposed project was reviewed pursuant to Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act. Section 10 of the Rivers and Harbors Act of 1899 requires that a DA permit be obtained for certain structures or work in or affecting navigable waters of the United States (U.S.), prior to conducting the work (33 U.S.C. 403). Section 404 of the Clean Water Act requires that a DA permit be obtained for the placement or discharge of dredged and/or fill material into waters of the U.S., including wetlands, prior to conducting the work (33 U.S.C. 1344).

Your plans indicate that no streams or wetlands would be impacted by the construction of the proposed sewer facilities at this time. Please note that streams and adjacent wetlands are considered waters of the United States pursuant to Section 404 of the Clean Water Act (CWA). Based on the information submitted by you, it does not appear that a Department of the Army authorization will be needed for this phase of the project.

We encourage construction plans that will avoid wetland and/or stream impacts if possible. If wetland or stream impacts are unavoidable on any phase of this project, a DA permit application should be submitted to this office before any work is done.

The Louisville District is available to participate in any onsite inspections of the proposed site and/or attend pre-application meetings to discuss aquatic resource impact avoidance and minimization.

Thank you for including this office in your scoping process. If we can be of further assistance or if you have any questions regarding DA permit requirements, please contact Justin Branham at the above address or telephone number 606-642-3208.

Sincerely,

A handwritten signature in blue ink that reads "Justin Branham". The signature is fluid and cursive, with the first name "Justin" and last name "Branham" clearly legible.

Justin Branham
Regulatory Specialist
Regulatory Branch



P. O. Box 444
Hindman, Kentucky 41822
Telephone: (606) 785-5926
Fax: (606) 785-0244
E-mail: Info@rmje.net

3213 Summit Square Place
Suite 100
Lexington, Kentucky 40509
Telephone: (859) 543-1256
Fax: (859) 543-9873

August 30, 2013

Mr. Mark Dennen
Executive Director and State Historic Preservation Officer
300 Washington Street
Frankfort, KY 40601

RE: Troublesome Creek Environmental Authority
Regional Facility Plan

Dear Mr. Dennen,

The Troublesome Creek Environmental Authority (TEA) is a non-profit entity created through an inter-local agreement executed by the County Judge Executives of Knott, Perry, and Breathitt Counties. TEA intends to submit a Regional Facility Plan to the Kentucky Division of Water to outline their goal of providing sanitary sewer facilities throughout the Troublesome Creek watershed in an effort to enhance the water quality of Troublesome Creek.

TEA proposes to construct, own and maintain wastewater treatment plants (WWTPs) strategically placed throughout the watershed to properly treat the sewerage, and sanitary sewer collection systems. A combination of gravity and force main collection systems are proposed throughout the region to collect the sewerage and transport it to the corresponding treatment facility. The gravity portions of the system will consist of a minimum pipe size of 8" and will be either PVC or ductile iron. The force main portion of the system will consist of a minimum of 3" and will be either PVC or HDPE and will require the installation of several regional lift stations. Customers located along the force main portions of the collection system will be connected to the main line using a residential grinder lift station which utilizes a 2" HDPE force main.

The attached map shows the Master Plan of the facilities. It includes preliminary locations of WWTPs, regional lift stations and the sanitary sewer collection systems. Please review and let us know if you have any questions. We would appreciate a response within 30 days if possible. Feel free to contact me at (859) 543-1256 extension 267 or by email at mscott@rmje.net. We appreciate the opportunity to work with you and look forward to your response.

Sincerely,
R.M. Johnson Engineering, Inc.

Michael Scott, EIT
Project Engineer



STEVEN L. BESHEAR
GOVERNOR

**TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY HERITAGE COUNCIL**

BOB STEWART
SECRETARY

THE STATE HISTORIC PRESERVATION OFFICE
300 WASHINGTON STREET
FRANKFORT, KENTUCKY 40601
PHONE (502) 564-7005
FAX (502) 564-5820
www.heritage.ky.gov

CRAIG A. POTTS
EXECUTIVE DIRECTOR AND
STATE HISTORIC PRESERVATION OFFICER

October 17, 2013

Michael Scott
R.M. Johnson Engineering
P.O. Box 444
Hindman, KY 41822

RE: Troublesome Creek Environmental Authority Regional Facility Plan

Mr. Scott,

Thank you for providing information regarding the above referenced project. Our review indicated that the proposed project has the potential to impact sites eligible for listing or currently listed on the National Register of Historic Places. Therefore, we recommend that a cultural historic survey and an archaeological survey be completed by qualified professionals prior to project implementation. Separate reports documenting the results of the cultural historic and archaeological investigations must be submitted to the State Historic Preservation Officer for review, comment and approval. Where a given project area or portions thereof have been disturbed by prior construction, the applicant may file documentation of that disturbance with the State Historic Preservation Office, and may request an opinion concerning the need of an archaeological survey.

For future submissions please refer to the following website <http://www.heritage.ky.gov/siteprotect/> where you will find three separate documents to assist you in submitting information to our office for review. Those documents include a memo outlining the standardized Section 106 submission process, a Section 106 Cover sheet that must be included with all submissions to our office, and instructions for the proper completion of the required cover sheet and associated information.

Should you have any questions, feel free to contact Yvonne Sherrick of my staff at 502- 564-7005 ext 113.

Sincerely,

Craig Potts, Executive Director
Kentucky Heritage Council and
State Historic Preservation Officer

CP:39878PJ



P. O. Box 444
Hindman, Kentucky 41822
Telephone: (606) 785-5926
Fax: (606) 785-0244
E-mail: info@rmje.net

3213 Summit Square Place
Suite 100
Lexington, Kentucky 40509
Telephone: (859) 543-1256
Fax: (859) 543-9873

August 30, 2013

Mr. Wayne Davis
KY Department of Fish and Wildlife Resources
Arnold L. Mitchell Bldg.
#1 Sportsman Lane
Frankfort, KY 40601

RE: Troublesome Creek Environmental Authority
Regional Facility Plan

Dear Mr. Davis,

The Troublesome Creek Environmental Authority (TEA) is a non-profit entity created through an inter-local agreement executed by the County Judge Executives of Knott, Perry, and Breathitt Counties. TEA intends to submit a Regional Facility Plan to the Kentucky Division of Water to outline their goal of providing sanitary sewer facilities throughout the Troublesome Creek watershed in an effort to enhance the water quality of Troublesome Creek.

TEA proposes to construct, own and maintain wastewater treatment plants (WWTPs) strategically placed throughout the watershed to properly treat the sewerage, and sanitary sewer collection systems. A combination of gravity and force main collection systems are proposed throughout the region to collect the sewerage and transport it to the corresponding treatment facility. The gravity portions of the system will consist of a minimum pipe size of 8" and will be either PVC or ductile iron. The force main portion of the system will consist of a minimum of 3" and will be either PVC or HDPE and will require the installation of several regional lift stations. Customers located along the force main portions of the collection system will be connected to the main line using a residential grinder lift station which utilizes a 2" HDPE force main.

I would like any information you have regarding threatened or endangered species and their habitats, trout streams/fish spawning areas and critical habitat areas within the project vicinity. If you have any previous studies that were conducted within the project area, please include this information. If you have any concerns about the potential impacts this project will have on the environment within the project vicinity, please advise.

The attached map shows the Master Plan of the facilities. It includes preliminary locations of WWTPs, regional lift stations and the sanitary sewer collection systems. Please review and let us know if you have any questions. We would appreciate a response within 30 days if possible. Feel free to contact me at (859) 543-1256 extension 260 or by email at mscott@rmje.net. We appreciate the opportunity to work with you and look forward to your response.

Sincerely,
R.M. Johnson Engineering, Inc.

Michael Scott, EIT
Project Engineer



**TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY DEPARTMENT OF FISH & WILDLIFE RESOURCES**

Steven L. Beshear
Governor

#1 Sportsman's Lane
Frankfort, Kentucky 40601
Phone (502) 564-3400
1-800-858-1549
Fax (502) 564-0506
fw.ky.gov
October 2, 2013

Bob Stewart
Secretary

R.M. Johnson Engineering, Inc.
Attn: Michael Scott, EIT
Project Engineer
P.O. Box 444
Hindman, Kentucky 41822

RE: Troublesome Creek Environmental Authority, Regional Facility Plan

Dear Mr. Scott:

The Kentucky Department of Fish and Wildlife Resources (KDFWR) has received your request for above reference information. The Kentucky Fish and Wildlife Information System indicates that the federally endangered Gray Myotis (*Myotis grisescens*) and a candidate for federal listing, the Kentucky Arrow Darter (*Etheostoma sagitta spilatum*) occur within the Troublesome Creek basin. In addition, KFWIS indicates that several state threatened/endangered aquatic species occur within the basin. KDFWR recommends implementing strict erosion control measures and best management practices to reduce impacts to these species. Please be aware that our database system is a dynamic one that only represents our current knowledge of various species distributions.

The majority of the streams within Robinson Forest are designated by Kentucky Division of Water as an Outstanding State Resource Waters and Reference Reach Waters. These exceptional waters represent some of the least impacted streams within the region.

KDFWR is responsible for three stream mitigation projects with the proposed project area. The projects are located on Balls Fork, Terry's Branch, and Laurel Fork within the Troublesome Creek basin. These projects were implemented as compensatory mitigation for impacts to streams authorized by the US Army Corps of Engineers (USACE) permits pursuant to Section 404 of the Clean Water Act. KDFWR is currently monitoring these sites for success as outlined in the USACE approved mitigation plans. KDFWR recommends avoiding impacts to these areas. KDFWR personnel have been in consultation with Mr. Steve Harris, the project manager for R.M. Johnson Engineering Inc. to discuss avoidance measures to the Balls Fork and Terry's Branch mitigation projects in 2010.

Based on this information, KDFWR provides the following recommendations:

- In areas where bats are known to occur, cave entrances, mine portals, and/or rock shelters that exist within the project area should be surveyed for potential use by such species as Gray bats. KDFWR recommends avoiding those areas that provide adequate habitat for bats.
- Portions of the project that cross streams should be constructed during low flow periods to minimize disturbances. When crossing a stream, the pipe should be laid perpendicular to the stream bank to minimize the direct impacts to the streambed. We recommend that all instream disturbances be returned to a stable condition upon completion of stream pipeline crossing. Preservation of any tree canopy overhanging streams should also be considered.
- To minimize indirect impacts to aquatic resources strict erosion control measures should be developed and implemented prior to construction to minimize siltation into streams and storm water drainage systems located within the project area. Such erosion control measures may include, but are not limited to silt fences, staked straw bales, brush barriers, sediment basins, pump around, and diversion ditches. Erosion control measures will need to be installed prior to construction and should be inspected and repaired regularly as needed.

I hope this information is helpful to you, and if you have questions or require additional information, please call me at (502) 564-7109 extension 4473.

Sincerely,



Joseph Zimmerman
Environmental Biologist

Cc: Environmental Section File



P. O. Box 444
Hindman, Kentucky 41822
Telephone: (606) 785-5928
Fax: (606) 785-0244
E-mail: info@rmje.net

3213 Summit Square Place
Suite 100
Lexington, Kentucky 40509
Telephone: (859) 543-1256
Fax: (859) 543-9873

August 30, 2013

Mr. Dave Edwards
Natural Soil Conservation Office
23 Dukes Branch Rd
Hindman, KY 41822

RE: Troublesome Creek Environmental Authority
Regional Facility Plan

Dear Mr. Edwards,

The Troublesome Creek Environmental Authority (TEA) is a non-profit entity created through an inter-local agreement executed by the County Judge Executives of Knott, Perry, and Breathitt Counties. TEA intends to submit a Regional Facility Plan to the Kentucky Division of Water to outline their goal of providing sanitary sewer facilities throughout the Troublesome Creek watershed in an effort to enhance the water quality of Troublesome Creek.

TEA proposes to construct, own and maintain wastewater treatment plants (WWTPs) strategically placed throughout the watershed to properly treat the sewerage, and sanitary sewer collection systems. A combination of gravity and force main collection systems are proposed throughout the region to collect the sewerage and transport it to the corresponding treatment facility. The gravity portions of the system will consist of a minimum pipe size of 8" and will be either PVC or ductile iron. The force main portion of the system will consist of a minimum of 3" and will be either PVC or HDPE and will require the installation of several regional lift stations. Customers located along the force main portions of the collection system will be connected to the main line using a residential grinder lift station which utilizes a 2" HDPE force main.

The attached map shows the Master Plan of the facilities. It includes preliminary locations of WWTPs, regional lift stations and the sanitary sewer collection systems. Please review and let us know if you have any questions. We would appreciate a response within 30 days if possible. Feel free to contact me at (859) 543-1256 extension 267 or by email at mscott@rmje.net. We appreciate the opportunity to work with you and look forward to your response.

Sincerely,
R.M. Johnson Engineering, Inc.

Michael Scott, EIT
Project Engineer

United States Department of Agriculture



NRCS

Natural
Resources
Conservation
Service

1925 Old Main Street
Suite 2
Maysville, KY. 41056
Ph: 606-759-5570

To: Michael Scott, EIT
R.M. Johnson Engineering, Inc.
3213 Summit Square Place
Suite 100
Lexington, KY 40509

September 18, 2013

Re: Troublesome Creek Environmental Authority
Regional Facility Plan

Mr. Scott,

NRCS provides information on the soils and/or impact to farmland according to the criteria set forth in 1985 National Food Security Act Manual. However, your request does not specify what information you are seeking.

In addition, the information provided with your request is inadequate for me to provide any soil information. The map needs to be a topographic type of sufficient scale for me to locate the various lines and sites. I need to know which lines are to be placed on existing highway right-of-ways or easements, if not, please indicate where the new right-of-ways easements will occur. WWTPs or any other site not on an existing right-of-way, urban area, residential, or other prior converted use area must be located with boundaries clearly marked on the map or maps. Also, is it necessary to have soils information provided now for parts of a project being planned 10 to 20 years in the future? Often these projects do change.

If needed as part of the preliminary planning, information on the soils of Breathitt, Knott, and Perry Counties is available on-line through USDA's Web Soil Survey.

If this office may be of additional assistance, please do not hesitate to contact my office in Maysville Ky. or contact the NRCS District Conservationist at 606-666-5138.

Steve Jacobs

Resource Soil Scientist, NRCS, Maysville, KY.

cc: Dave Edwards, NRCS District Conservationist, Jackson, KY



P. O. Box 444
Hindman, Kentucky 41822
Telephone: (606) 785-5926
Fax: (606) 785-0244
E-mail: info@rmje.net

3213 Summit Square Place
Suite 100
Lexington, Kentucky 40509
Telephone: (859) 543-1258
Fax: (859) 543-9873

August 30, 2013

Mr. Lee Andrews
Field Office Supervisor
U.S. Fish and Wildlife Service
3761 Georgetown Road
Frankfort, KY 40601

RE: Troublesome Creek Environmental Authority
Regional Facility Plan

Dear Mr. Andrews,

The Troublesome Creek Environmental Authority (TEA) is a non-profit entity created through an inter-local agreement executed by the County Judge Executives of Knott, Perry, and Breathitt Counties. TEA intends to submit a Regional Facility Plan to the Kentucky Division of Water to outline their goal of providing sanitary sewer facilities throughout the Troublesome Creek watershed in an effort to enhance the water quality of Troublesome Creek.

TEA proposes to construct, own and maintain wastewater treatment plants (WWTPs) strategically placed throughout the watershed to properly treat the sewerage, and sanitary sewer collection systems. A combination of gravity and force main collection systems are proposed throughout the region to collect the sewerage and transport it to the corresponding treatment facility. The gravity portions of the system will consist of a minimum pipe size of 8" and will be either PVC or ductile iron. The force main portion of the system will consist of a minimum of 3" and will be either PVC or HDPE and will require the installation of several regional lift stations. Customers located along the force main portions of the collection system will be connected to the main line using a residential grinder lift station which utilizes a 2" HDPE force main.

The attached map shows the Master Plan of the facilities. It includes preliminary locations of WWTPs, regional lift stations and the sanitary sewer collection systems. I would like any information USFWS may have regarding threatened and endangered species that have the potential to be present within the project area. Please review and let us know if you have any concerns. We would appreciate a response within 30 days if possible. Feel free to contact me at (859) 543-1256 extension 267 or by email at mscott@rmje.net. We appreciate the opportunity to work with you and look forward to your response.

Sincerely,
R.M. Johnson Engineering, Inc.

Michael Scott, EIT
Project Engineer



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kentucky Ecological Services Field Office
330 West Broadway, Suite 265
Frankfort, Kentucky 40601
(502) 695-0468

September 17, 2013

Mr. Michael Scott
Project Engineer
R.M. Johnson Engineering, Inc.
P.O. Box 444
Hindman, KY 41822

Re: FWS 2013-B-0756; Troublesome Creek Environmental Authority; Regional Facility Plan; located in Knott, Perry, and Breathitt counties, Kentucky

Dear Mr. Scott:

Thank you for the opportunity to provide comments on the above-referenced project. The U.S. Fish and Wildlife Service (Service) has reviewed this proposed project and offers the following comments in accordance with the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*). This is not a concurrence letter. Please read carefully, as further consultation with the Service may be required.

In accordance with the provisions of the Fish and Wildlife Coordination Act, the Service has reviewed the project with regards to the effects the proposed actions may have on wetlands and/or other jurisdictional waters. We recommend that project plans be developed to avoid impacting wetland areas and/or streams, and reserve the right to review any required federal or state permits at the time of public notice issuance. The U.S. Army Corps of Engineers should be contacted to assist you in determining if wetlands or other jurisdictional waters are present or if a permit is required.

In order to assist you in determining if the proposed project has the potential to impact protected species we have searched our records for occurrences of listed species within the vicinity of the proposed project. Based upon the information provided to us and according to our databases, we believe that the following federally listed species have the potential to occur within the project vicinity. The listed species are:

Group	Species	Common name	Legal ^a Status
Mammals	<i>Myotis sodalis</i>	Indiana bat	E
Fishes	<i>Etheostoma sagitta spilotum</i>	Kentucky arrow darter	C

^a Key to notations: E = Endangered, T = Threatened, C = Candidate, CH = Critical Habitat

We must advise you that collection records available to the Service may not be all-inclusive. Our database is a compilation of collection records made available by various individuals and resource agencies. This information is seldom based on comprehensive surveys of all potential habitats and thus does not necessarily provide conclusive evidence that protected species are present or absent at a specific locality.

Indiana bat

Parts of the proposed project site are located within habitat designated as “maternity,” “swarming,” “non-maternity summer,” and the remainder of the proposed project is located within “potential habitat” for the Indiana bat.

The Indiana bat utilizes a wide array of forested habitats, including riparian forests, bottomlands, and uplands for both summer foraging and roosting habitat. Indiana bats typically roost under exfoliating bark, in cavities of dead and live trees, and in snags (*i.e.*, dead trees or dead portions of live trees). Trees in excess of 16 inches diameter at breast height (DBH) are considered optimal for maternity colony roosts, but trees in excess of 9 inches DBH appear to provide suitable maternity roosting habitat. Male Indiana bats have been observed roosting in trees as small as 5 inches DBH.

Prior to hibernation, Indiana bats utilize the forest habitat around the hibernacula (*i.e.* cave) to feed and roost until temperatures drop to a point that forces them into hibernation. This “swarming” period is dependent upon weather conditions and lasts from about September 15 to about November 15. This is a critical time for Indiana bats, since they are acquiring additional fat reserves and mating prior to hibernation. Research has shown that bats exhibiting this “swarming” behavior will range up to five miles from chosen hibernacula during this time. For hibernation, the Indiana bat prefers limestone caves, sandstone rockshelters, and abandoned underground mines with stable temperatures of 39 to 46 degrees F and humidity above 74 percent but below saturation.

Because we have concerns relating to the Indiana bat on this project, we have the following recommendations relative to Indiana bats:

- The project proponent can modify the proposed project to eliminate or reduce impacts to potential Indiana bat roost trees. If this is not practicable, we would recommend that the project proponent only remove potential roost trees within the project area between October 15 and March 31 as to avoid directly impacting summer roosting Indiana bats. Removing trees during the specified “unoccupied” period avoids direct effects to Indiana bats. However, additional measures will be necessary to address the indirect effects of tree removal within known Indiana bat habitat and are sometimes necessary within potential habitat to ensure that the project is in full compliance with the ESA. Please contact this office for more information about these additional measures.
- Based on the presence of numerous caves, rock shelters, and underground mines in Kentucky, we believe that it is reasonable to assume that other caves, rock shelters, and/or abandoned underground mines may occur within the project area, and, if they occur, they could provide winter habitat for Indiana bats. Therefore, we would

recommend that the project proponent survey the project area for caves, rock shelters, and underground mines, identify any such habitats that may exist on-site, and avoid impacts to those sites pending an analysis of their suitability as Indiana bat habitat by this office.

Kentucky Arrow Darter

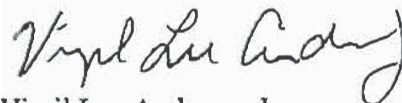
Kentucky arrow darter is a federal candidate species, which means the Service has sufficient information on its biological status and threats to propose Kentucky arrow darter as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. Candidate species receive no statutory protection under the ESA. The Service encourages cooperative conservation efforts for these species because they are, by definition, species that may warrant future protection under the ESA.

Addressing the needs of Kentucky arrow darter before the regulatory requirements associated with a listed threatened or endangered species come into play, will allow developers, landowners, and other entities greater management flexibility to stabilize or restore the species and its habitat for future projects. In addition, as such threats are reduced and populations are increased or stabilized, priority for listing can be shifted to those species in greatest need of the ESA's protective measures. Ideally, sufficient threats can be removed to eliminate the need for listing.

The Kentucky arrow darter is a rather large, brightly colored darter that is restricted to the upper Kentucky River basin in eastern Kentucky. The species' preferred habitat consists of pools or transitional areas between riffles and pools (runs and glides) in moderate to high gradient streams with bedrock, boulder, and cobble substrates. The species' habitat and range have been severely degraded and limited by water pollution from surface coal mining and gas-exploration activities; removal of riparian vegetation; stream channelization; increased siltation associated with poor mining, logging, and agricultural practices; and deforestation of watersheds. A habitat assessment and/or survey may be necessary to determine if the species is within the action area of the proposed project. If the species is present, we recommend directional boring and the implementation of BMPs to reduce impacts to the species.

Thank you again for your request. Your concern for the protection of endangered and threatened species is greatly appreciated. If you have any questions regarding the information that we have provided, please contact Jessi Miller at (502) 695-0468 extension 104.

Sincerely,



Virgil Lee Andrews, Jr.
Field Supervisor



P. O. Box 444
Hindman, Kentucky 41822
Telephone: (606) 785-5926
Fax: (606) 785-0244
E-mail: info@rmje.net

3213 Summit Square Place
Suite 100
Lexington, Kentucky 40509
Telephone: (859) 543-1256
Fax: (859) 543-9873

April 19, 2013

Mr. Courtney Seitz
Waste Load Allocation Coordinator
Kentucky Division of Water
200 Fair Oaks Lane
Frankfort, KY 40601

RE: Waste Load Allocation Request Letter
TEA - Breathitt County WWTP

Dear Mr. Seitz,

On behalf of the Troublesome Creek Environmental Authority (TEA), please accept this letter as our formal Waste Load Allocation Request Letter for the proposal Breathitt County Wastewater Treatment Plant (WWTP).

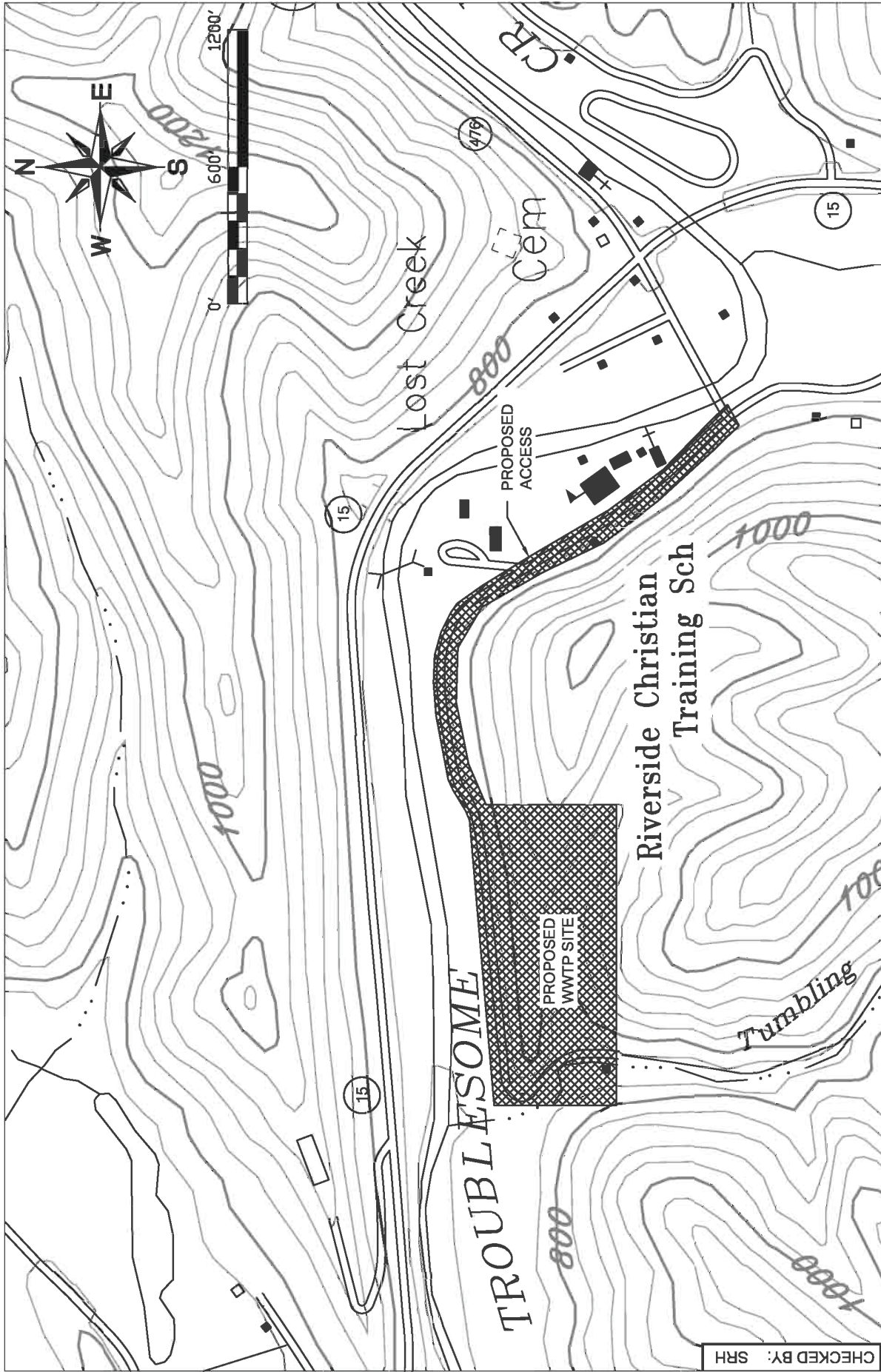
The proposed plant will be located near Riverside Christian Academy at the Lost Creek community of Breathitt County (Lat/Long: 37°28'50.8"/83°20'03.3"). The WWTP will consist of a Sequential Batch Reactor (SBR), ultraviolet disinfection (UV), post aeration, automated sampling and controls and will discharge into Troublesome Creek at location Lat/Long: 37°28'54.4"/83°20'07.1". The average daily design flow is 0.10 MGD. See the attached location map (Haddix USGS Quad).

TEA is currently working to complete a new Regional Facility Plan. The waste load allocation requested herein will be included into the Facility Plan. If you have any questions regarding this new facility please contact me at sharris@rmje.net or (606) 785-5926.

Sincerely,
R.M. Johnson Engineering, Inc.

Stephen R. Harris, PE
Project Engineer

Cc: Ron Johnson, PE, RMJE
Jared Salmons, RMJE
File



DRAWN BY: SRH CHECKED BY: SRH

RMJE
R.M. JOHNSON ENGINEERING, INC.
3376 Rt. 550 East
P.O. Box 444
Hindman, KY 41822

3213 Summit Square Place
Suite 100
Lexington, KY 40509

TRoublesome Creek Environmental Authority
RIVERSIDE CHRISTIAN SCHOOL
PROPERTY LOCATION MAP

SHEET: 1
DATE: 4-17-12



STEVEN L. BESHEAR
GOVERNOR

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
200 FAIR OAKS LANE
FRANKFORT, KENTUCKY 40601
www.kentucky.gov

LEONARD K. PETERS
SECRETARY

March 13, 2014

Mr. Jared Salmons
R.M. Johnson Engineering, Incorporated
P.O. Box 444
Hindman, Kentucky 41822

Re: Waste Load Allocation Request
Proposed TEA - Breathitt County WWTP
Breathitt County, Kentucky

Dear Mr. Salmons:

This is in response to correspondence dated April 19, 2013 from Stephen Harris (attached), on behalf of the Troublesome Creek Environmental Authority (TEA). A waste load allocation (WLA) is requested for a proposed 0.1 MGD wastewater treatment plant (WWTP) to serve portions of Breathitt County. The treatment train will include a sequential batch reactor, ultraviolet disinfection, and post aeration. The WWTP is to be located near Riverside Christian Academy in the community of Lost Creek at Longitude 83°20'3.3" W and Latitude 37°28'50.8" N. Discharge is proposed to Troublesome Creek at Longitude 83°20'7.1" W and Latitude 37°28'54.4" N, approximately National Hydrography Database (NHD) mile point (mp) 0.9, segment 04050. The requested WLA information will be utilized in drafting a Regional Wastewater Facility Plan.

The division notes that Troublesome Creek (NHD mp 0.0 to 45.1) is included on the 2010 303(d) List of impaired waters. The impaired uses listed are warm water aquatic habitat (nonsupport) and primary contact recreation (nonsupport). The pollutants of concern are: sedimentation/siltation, specific conductance, total dissolved solids (TDS), and turbidity. The suspected sources are: coal mining, municipal point source discharges, and petroleum/natural gas activities (permitted). Further, it is noted that a total maximum daily load (TMDL), addressing fecal coliform/escherichia coli pollution in the North Fork Kentucky River Basin, including Troublesome Creek, was approved in 1994. State and Federal regulations allow new or expanded discharges into impaired waters only if the discharge will improve, or at least not contribute, to existing impairments. In addition, the discharge must be consistent with the requirements of any approved TMDL. Discharge from the proposed WWTP, in compliance with applicable Kentucky Pollutant Discharge Elimination System (KPDES) permit limitations and requirements, would not be considered a contributor to the existing impairments, and could thus be approved.

Mr. Jared Salmons
Waste Load Allocation Request
Page Two

Considering the above-mentioned information, applicable effluent limitations are provided below.

Design Capacity = 0.1 MGD / Discharge near NHD mp 0.9 of Troublesome Creek

<u>Parameter</u>	<u>May 1 - October 31</u>	<u>November 1 - April 30</u>
CBOD ₅	25 mg/l	25 mg/l
Total Suspended Solids	30 mg/l	30 mg/l
Ammonia Nitrogen	15 mg/l	15 mg/l
Dissolved Oxygen	7 mg/l	7 mg/l
Total Phosphorus	Monitor, mg/l	Monitor, mg/l
Total Nitrogen	Monitor, mg/l	Monitor, mg/l

Reliability Classification = Grade C

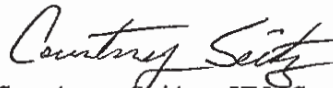
In addition to the above requirements, the monthly average and weekly maximum values of E. coli shall be at or below 130 colonies per 100 milliliters or 240 colonies per 100 milliliters, respectively, the year around. Additional effluent limitations and water quality standards are contained in 401 KAR Chapter 5 and 401 KAR Chapter 10.

A site inspection has been completed at the proposed WWTP site. The inspector noted that the site is in close proximity to the 100 year floodplain. Please contact Todd Powers of the Floodplain Management Section of the Surface Water Permits Branch at (502) 564-8158, extension 4902 regarding any potential floodplain construction requirements relative to the project.

These preliminary design effluent limitations are valid for one (1) year from the date of this letter, and are subject to change as a result of additional information which may be presented during the public notice phase of the KPDES permitting process. As such, this letter does not convey any authorization or approval to proceed with the construction or operation of the proposed WWTP. Construction and KPDES permit applications must be submitted to request such authorization or approval. Nor does this letter ensure issuance of either permit. During the review processes of these permits the Division of Water will further evaluate the viability of the project.

Should you have any questions regarding this letter, please contact me at (502) 564-3410, extension 4914 or E-mail at Courtney.Seitz@ky.gov.

Sincerely,

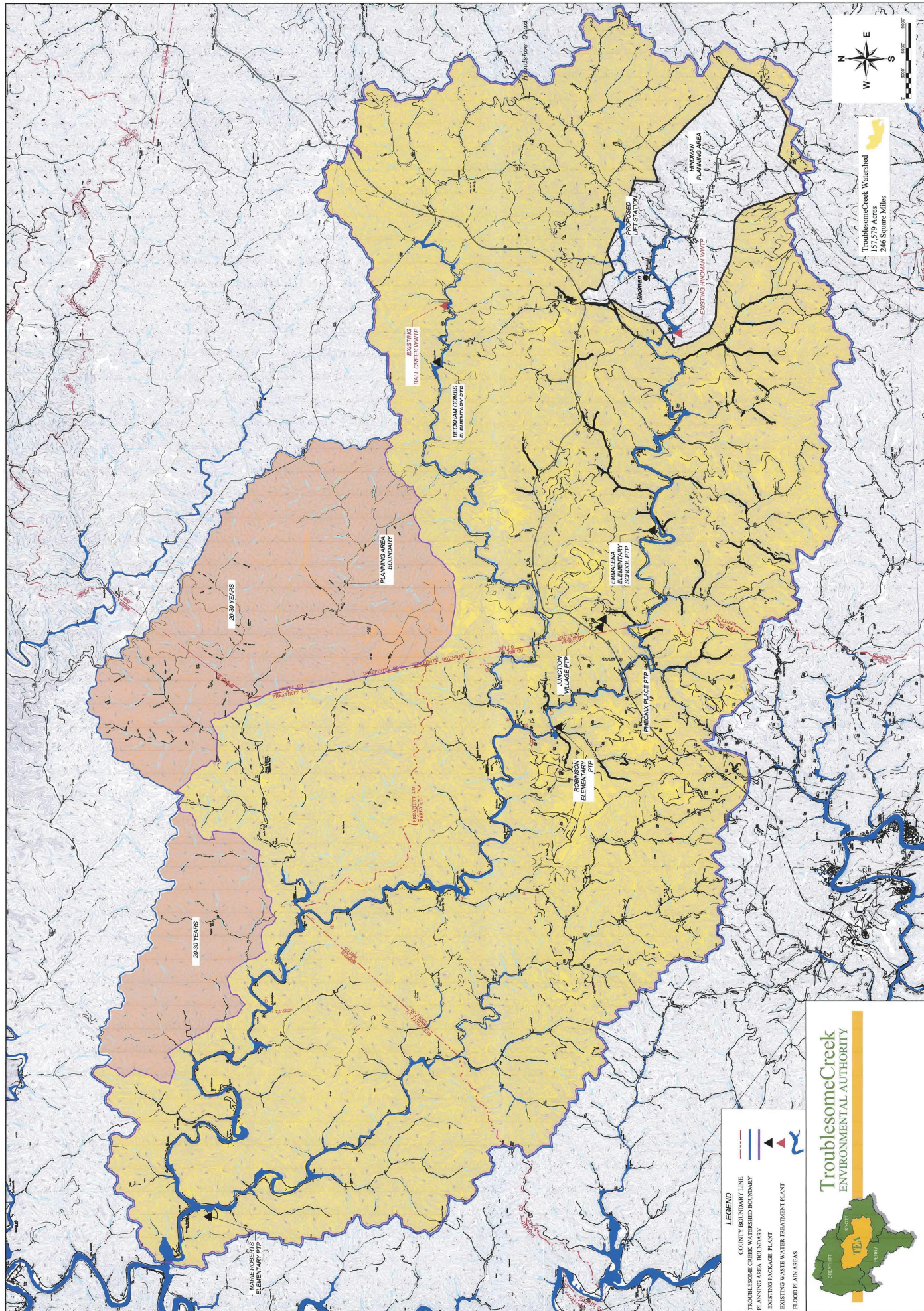


Courtney Seitz, WLA Coordinator
Wet Weather Section
Surface Water Permits Branch
Division of Water

CS:cs

c: Cindy McDonald, Water Infrastructure Branch
Compliance and Technical Assistance
Branch, Hazard Section
TEMPO

APPENDIX B



TEA Sewer Collection and Treatment Area - Figure A

LEGEND

COUNTY BOUNDARY LINE

PROPOSED RIVERSIDE WWTP

PROPOSED WASTE WATER TREATMENT PLANT

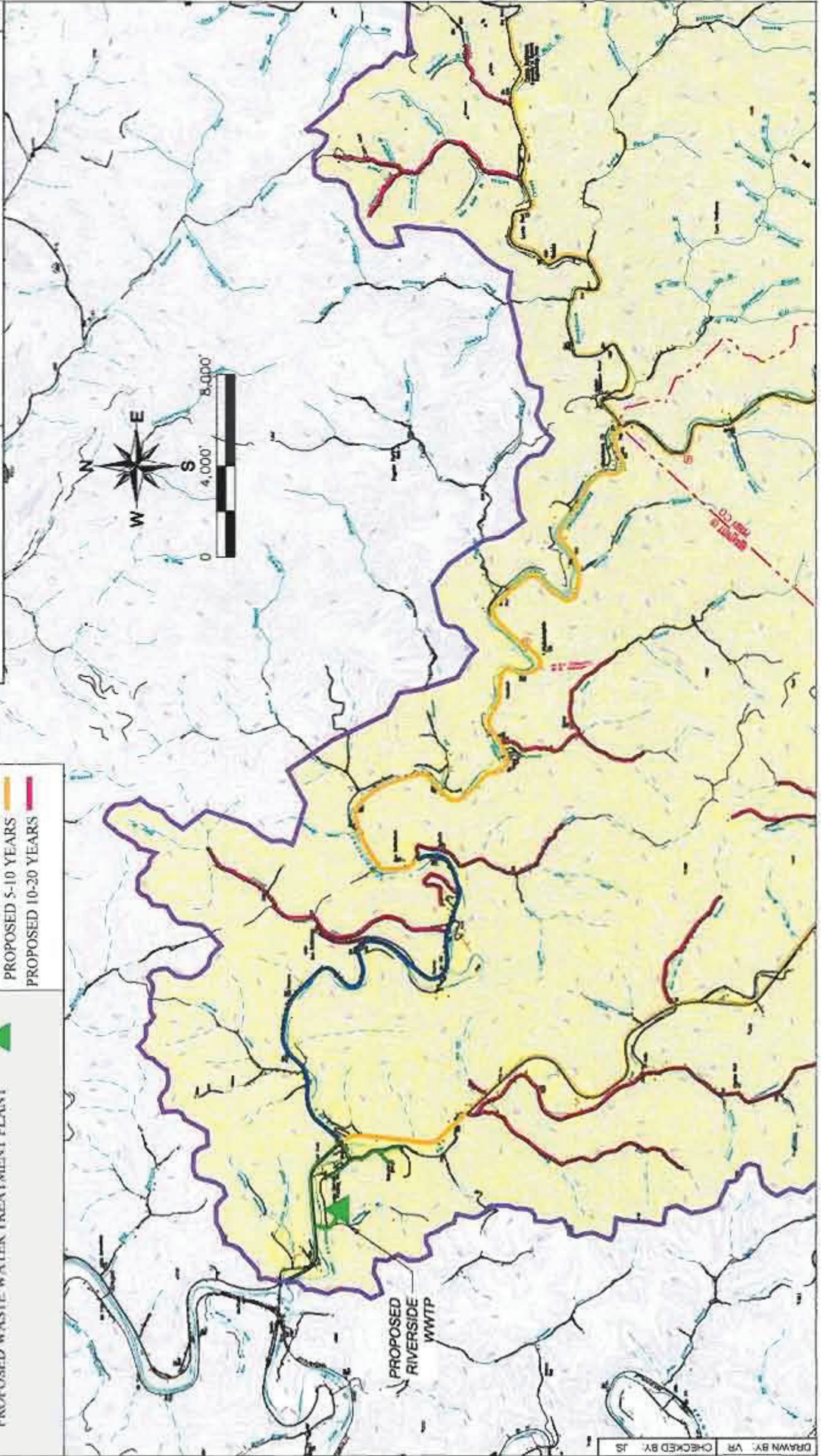
PROPOSED PHASE COLORS

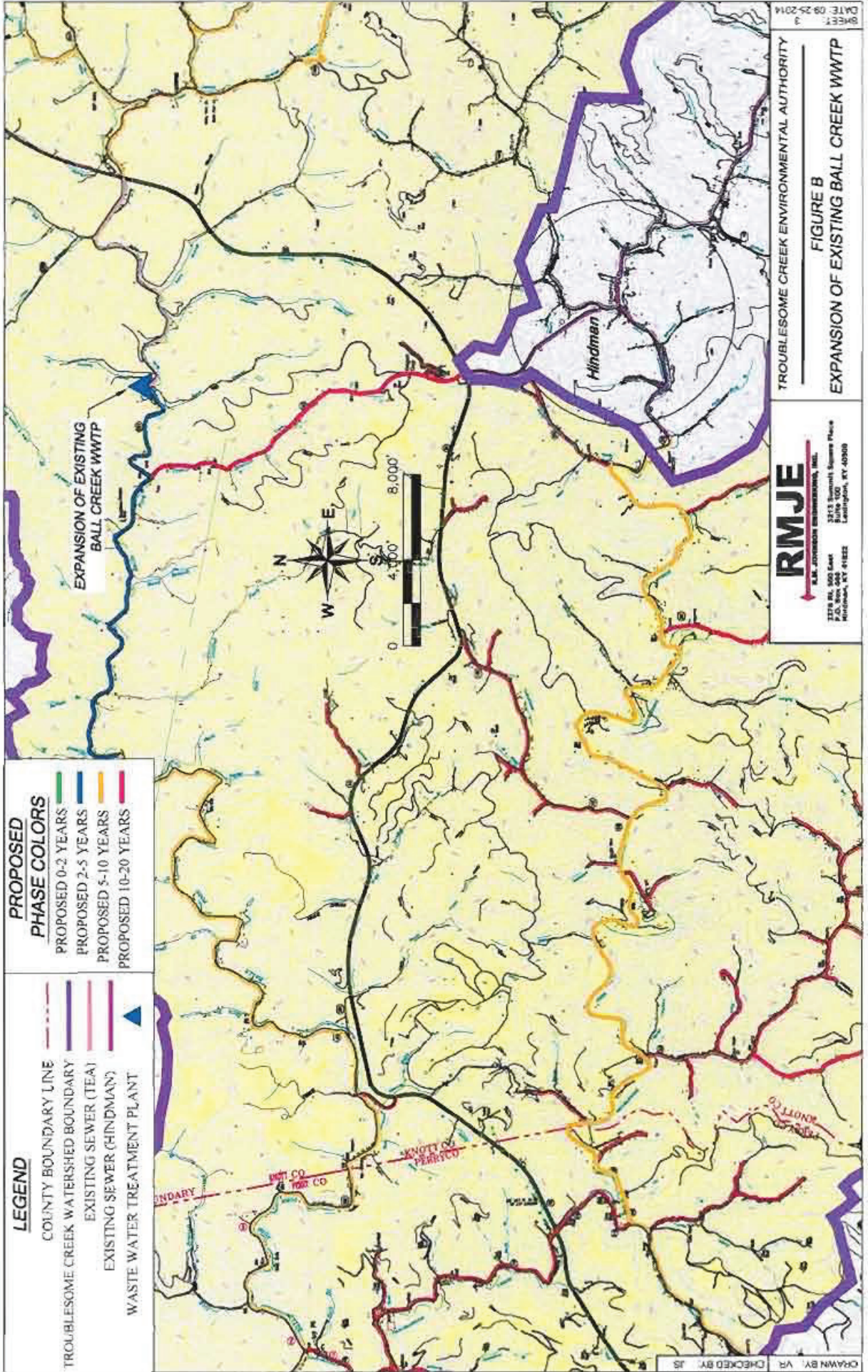
PROPOSED 0-2 YEARS

PROPOSED 2-5 YEARS

PROPOSED 5-10 YEARS

PROPOSED 10-20 YEARS





**PROPOSED
PHASE COLORS**

- PROPOSED 0-2 YEARS
- PROPOSED 2-5 YEARS
- PROPOSED 5-10 YEARS
- PROPOSED 10-20 YEARS

LEGEND

- COUNTY BOUNDARY LINE
- TROUBLESOME CREEK WATERSHED BOUNDARY
- EXISTING SEWER (TEA)
- EXISTING SEWER (HINDMAN)
- WASTE WATER TREATMENT PLANT

DATE: 09-25-2014
SHEET: 3

TROUBLESOME CREEK ENVIRONMENTAL AUTHORITY

FIGURE B

EXPANSION OF EXISTING BALL CREEK WWTW

RMJE

R.M. JOHNSON ENGINEERING, INC.

3238 Rt. 100 East
P.O. Box 666
Hindman, KY 40009

3213 Spanglet Square Place
Suite 100
Lexington, KY 40503

DRAWN BY: VR
CHECKED BY: JS



3376 Hwy 550 E
P.O. Box 444
Hindman, Ky 41822

3213 Summit Square Place
Suite 100
Lexington, KY 40509